Lotus Sport – Fitting Instructions

Supercharged Toyota 2ZZ-GE Engines

Application Specific in S2 Exige

Supercharger Kit ALS3E0073J is for VIN numbers from 82384
Supercharger Kit ALS3E0076J is for VIN numbers upto and including 82384 (kit to include the ECU)

Difficulty

TOOLS REQUIRED

- LOTUS SERVICE MANUAL (A120T0327J)
- TOYOTA SERVICE MANUAL RM733E
- TOYOTA SERVICE MANUAL RM929E
- VEHICLE SUPPORT RAMP
- OIL DRAIN CAN
- RATCHETS
- SPANNERS – ASSORTED
- ALLEN KEYS - ASSORTED
- PHILLIPS HEAD SCREWDRIVER
- FLAT BLADED SCREWDRIVER
- SIDE CUTTERS
- BOILING WATER TO SOFTEN HOSE ENDS
- SOCKETS - ASSORTED
- LOCTITE '120'
- BETASEAL
- BETAPRIME
- STUD EXTRACTOR SET
- CRAFT KNIFE
- BETASEAL 1701
- SUITABLE GUN FOR APPLING BETASEAL
- CIRCLIP PLIERS
- MASKING TAPE
- CLEAN WORKING BENCH AND AREA
- TORQUE WRENCH
- EXTENSION BARS
- COTTON BUDS FOR PRIMER APPLICATION
- PAINT PEN
- HACKSAW OR SUITABLE CUTTING TOOL
- MALLETS
- HAVOLINE XLC COOLANT/WATER 50% MIX
- STRAP WRENCH

INSTRUCTIONS

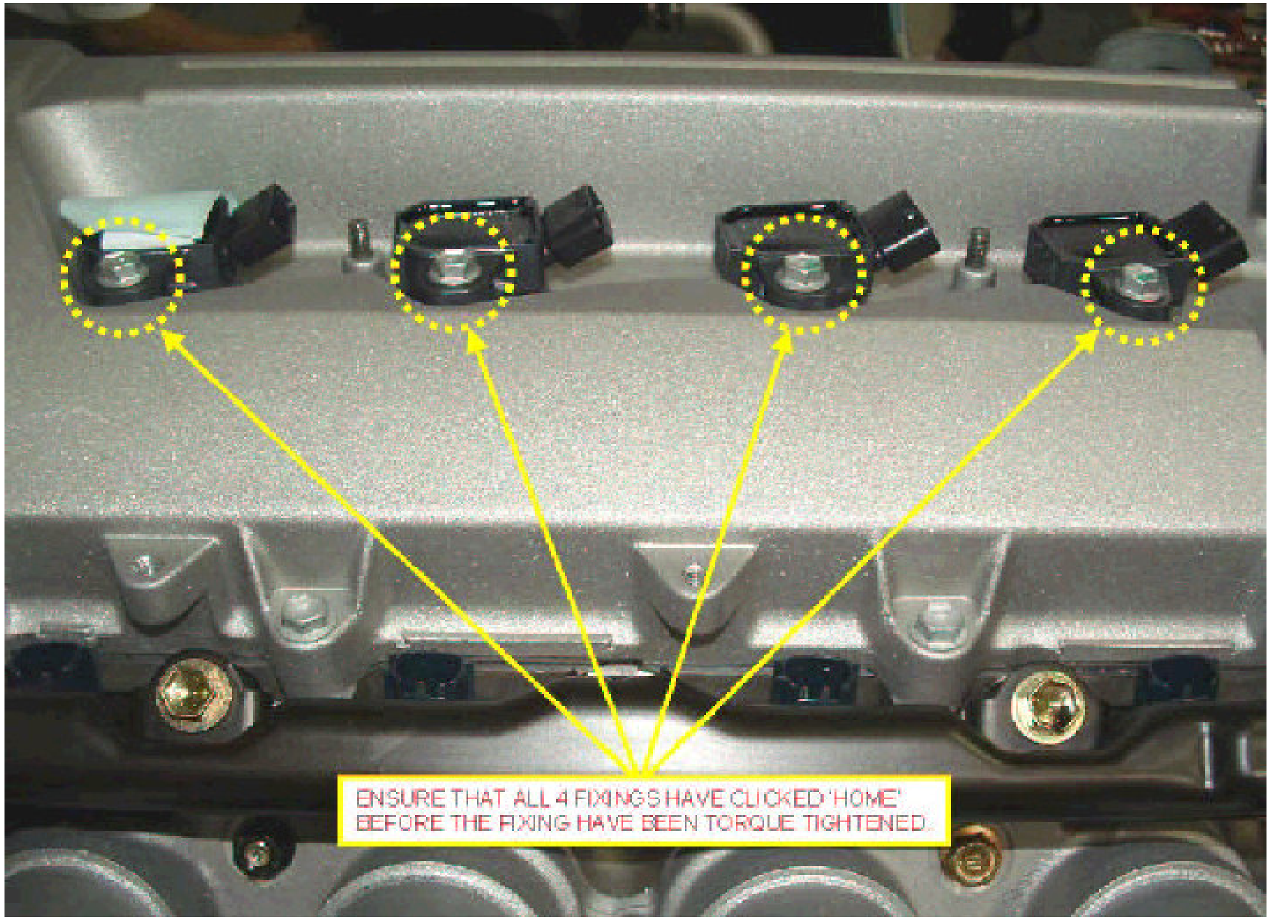
NOTE 1: THE SUPERCHARGER WILL BE FITTED TO THE ENGINE WHILST IN SITU.
NOTE 2: ALL BOLTS SHOULD BE TORQUED CORRECTLY – SEE LOTUS SERVICE MANUAL FOR STANDARD PART OR TORQUE REFERENCE
NOTE 3: ALL BOLTS TORQUED SHOULD BE PAINT MARKED.
NOTE 4: ENSURE ALL NESSECARY SAFETY PRODECURES ARE FOLLOWED AND PRECAUTIONS TAKEN.

ACTIVITY	MATERIALS	AREA	PROCESS	CAREPOINTS
CLEAN PROCESS # 1	3900	Either work area, wipe only with BETACLEAN 3900	Dampen paper with BETACLEAN 3900 , wipe bond path & then dry wipe **IMMEDIATELY** with clean paper	Gloves , mask, goggles
CLEAN PROCESS # 2	VP04604	Trim & final area , wipe only with Betawipe VP04604, chassis, glass etc	Dampen paper with BETAWIPE VP04604 , wipe bond path & then dry wipe **IMMEDIATELY** with clean paper	Gloves , mask, goggles

WARNING

! DO NOT ATTEMPT TO DO THIS MODIFICATION WITH THE ENGINE RUNNING OR WHEN THE ENGINE IS HOT.
! TAKE ALL NECESSARY PRECAUTIONS TO GUARD AGAINST FIRE AND EXPLOSION RISK WHEN DEALING WITH FUEL AND FUEL VAPOUR.
! LOTUS SPORT RECOMMEND RUNNING THE VEHICLE WITH THE ACCUMSUMP AND CLUTCH UPGRADE
! ENSURE THAT BRAKE UPGRADE IS FITTED

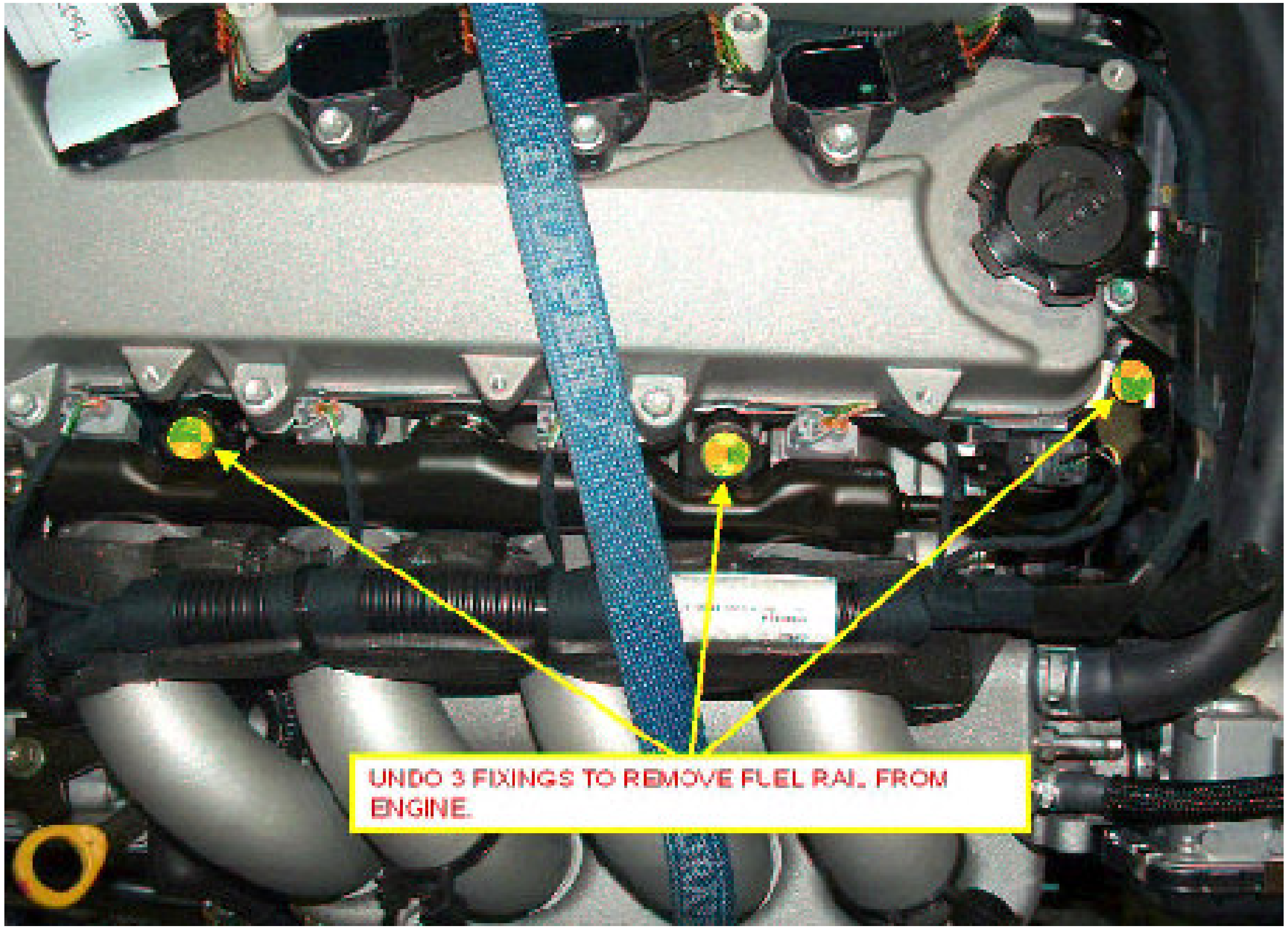
READ THESE INSTRUCTIONS THOROUGHLY BEFORE COMMENCING WORK AND ENSURE ALL COMPONENTS ARE PRESENT. IF IN ANY DOUBT, CONSULT A LOTUS DEALER BEFORE UNDERTAKING THE WORK.



SEQ	ACTIVITY – PREPARATION, SPARK PLUGS
	Following instructions in service manual (A120T0327J) and Toyota manuals RM733E and RM929E:
10	Remove Rear clamshell (including passenger seat, under-tray, wheel and liners)
20	Remove Exhaust Cat pipe and remove rear engine mount heat shield plus exhaust manifold stay
30	Remove EVAP canister, bracket and pipes from rear bulkhead and bobbins
40	Remove Air box
50	Undo the 4 fixings that secure the coil pack to the engine
60	Remove coil packs and place to one side with fixings for re-fitment
70	Using spark plug removal tool, undo and remove all 4 spark plugs. Once removed discard spark plugs.
80	Collect new uprated spark plugs
90	Using spark plug tool, fit 4 new spark plugs. Tighten spark plugs so that they are hand tight.
100	Using specified torque wrench, torque tighten sparks plugs to required torque.
120	Re-fit coil packs as removed ensuring that they have clicked home. Torque tighten retaining bolts on coil packs to specified torque.
130	Green paint mark the head of each fixing
140	Remove auxiliary drive belt

CAREPOINT	QUALITY STANDARD
70 When re-fitting the coil packs, ensure that they have clicked home over the spark plugs	

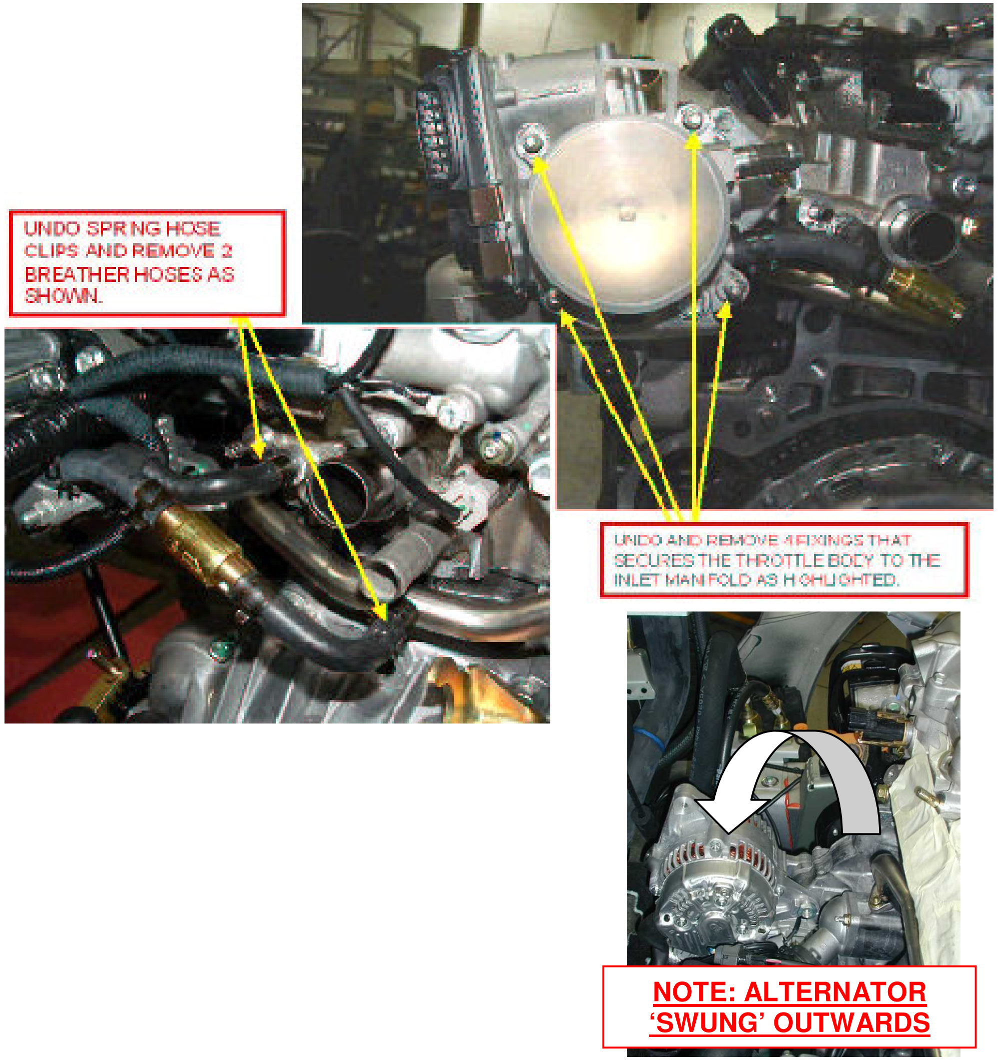
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
100	N/A	Torque / Tooling Reference	0	-	18Nm	Torque Wrench
120	N/A	Torque / Tooling Reference	0	-	9Nm	Torque Wrench



SEQ	ACTIVITY – REMOVE FUEL RAIL
10	Undo the 3 fixings that secures the fuel rail into position
20	Remove the fixings and place aside for re-fitment
30	Remove the fuel rail ensuring that the seals stay in the ports of the engine and are not removed with the fuel rail itself.

CAREPOINT	QUALITY STANDARD
30 Ensure that the seals remain and are not removed with the rail	

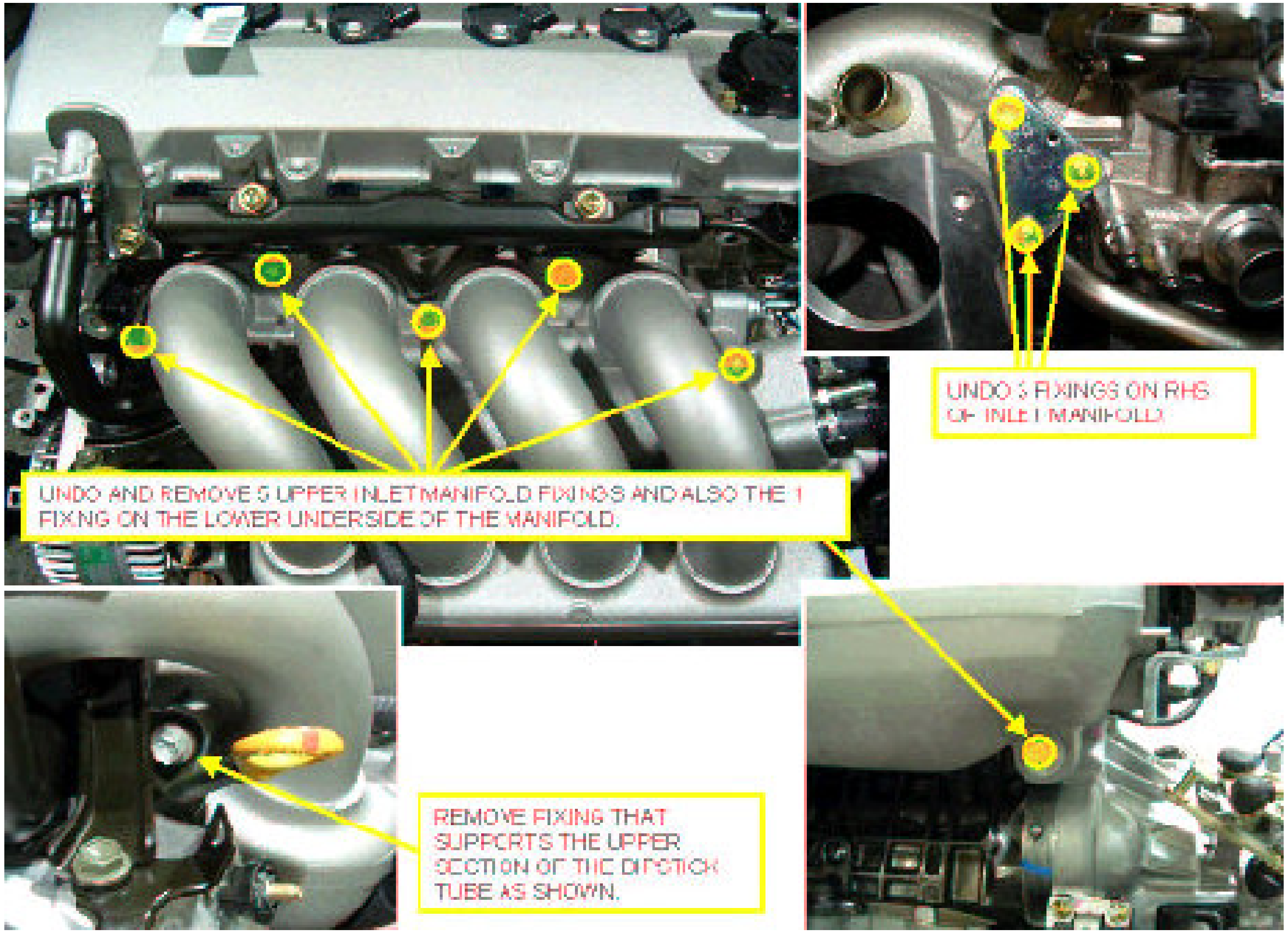
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING



SEQ	ACTIVITY – THROTTLE BODY, ALTERNATOR
10	Using hose clamp pliers, release spring hose clip on 2 breather hoses that are attached to head of the engine.
20	Remove hoses from the head of the engine.
30	Undo the 4 fixings on the front face of the throttle body. Remove fixings and place to one side.
40	Also undo and remove the 2 fixings on the underside of the throttle body and remove bracket.
50	With throttle body still attached place (still connected) out of way.
60	Remove the top fixings that secure the alternator stabiliser bracket to the alternator and engine, and slacken off the lower fixings but do not remove. Swing alternator away from engine, so that it is 'out of the way'.
70	Once loose discard fixings and also stabiliser bracket
80	Remove alternator upper fixings, foam from loam and 8mm stud.
	Note: Picture indicates electronic throttle, kits supplied to third parties will have mechanical throttle. Process identical apart from cab;e

CAREPOINT	QUALITY STANDARD

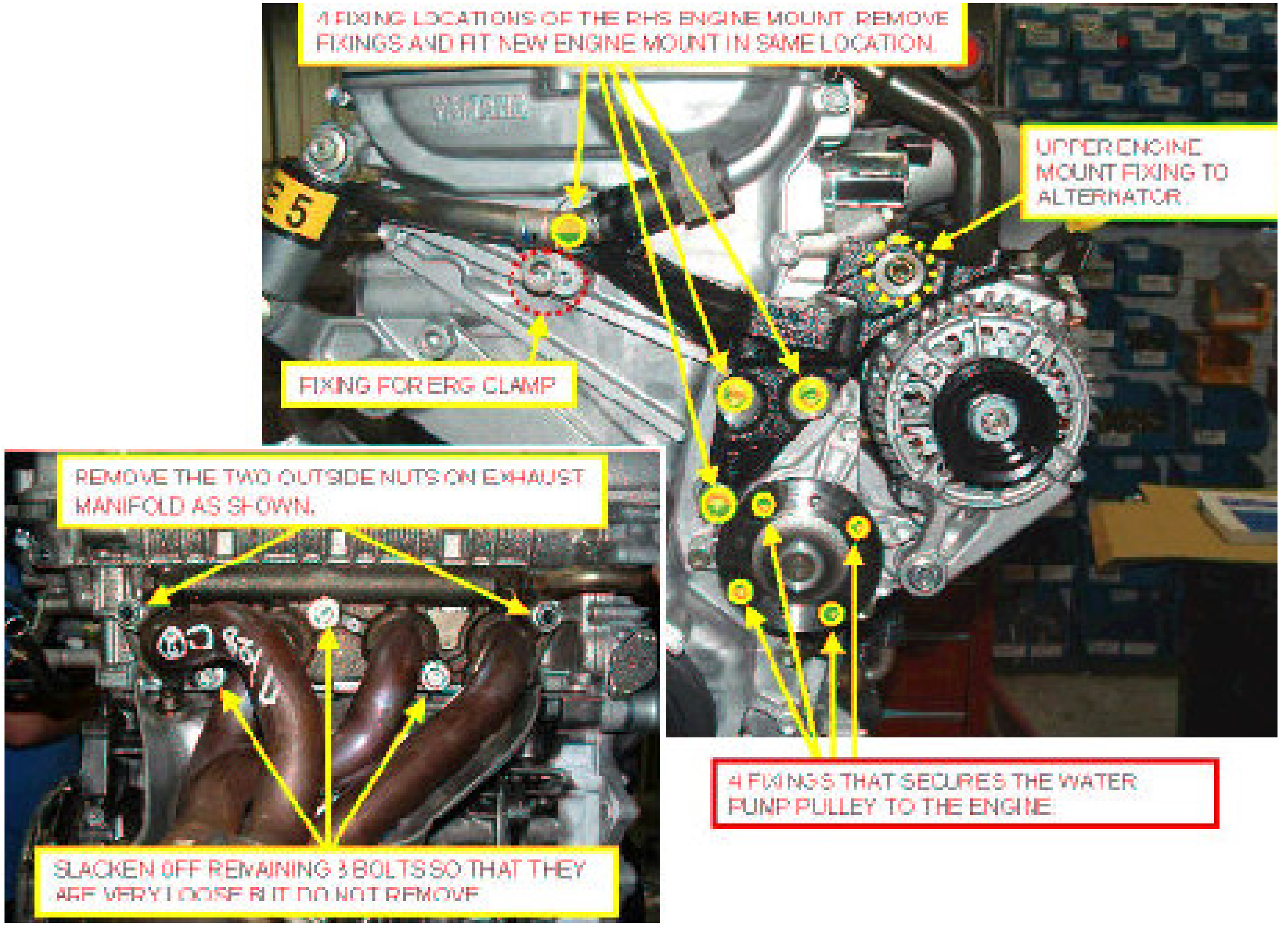
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
100	N/A	Torque/Tooling Refernce	-	-		Hose clamp pliers



SEQ	ACTIVITY – INLET MANIFOLD
10	Undo the fixing that secures the upper section of the dipstick tube to the manifold. Remove fixing and place aside for re-fitment.
20	Undo the 3 fixings on the RHS of the inlet manifold to remove the triangular bracket.
30	Undo the 5 fixings that secure the upper main section of the inlet manifold to head and place fixings aside.
40	Undo remaining lower fixing that secures the inlet manifold to the head. Remove and place aside for re-fitment.
50	Remove manifold from engine and discard.
60	Remove gasket and discard
70	Using masking tape cover the ports to the engine to prevent dirt, dust etc being inhaled.
80	Remove the foam padding situated below the inlet manifold

CAREPOINT	QUALITY STANDARD

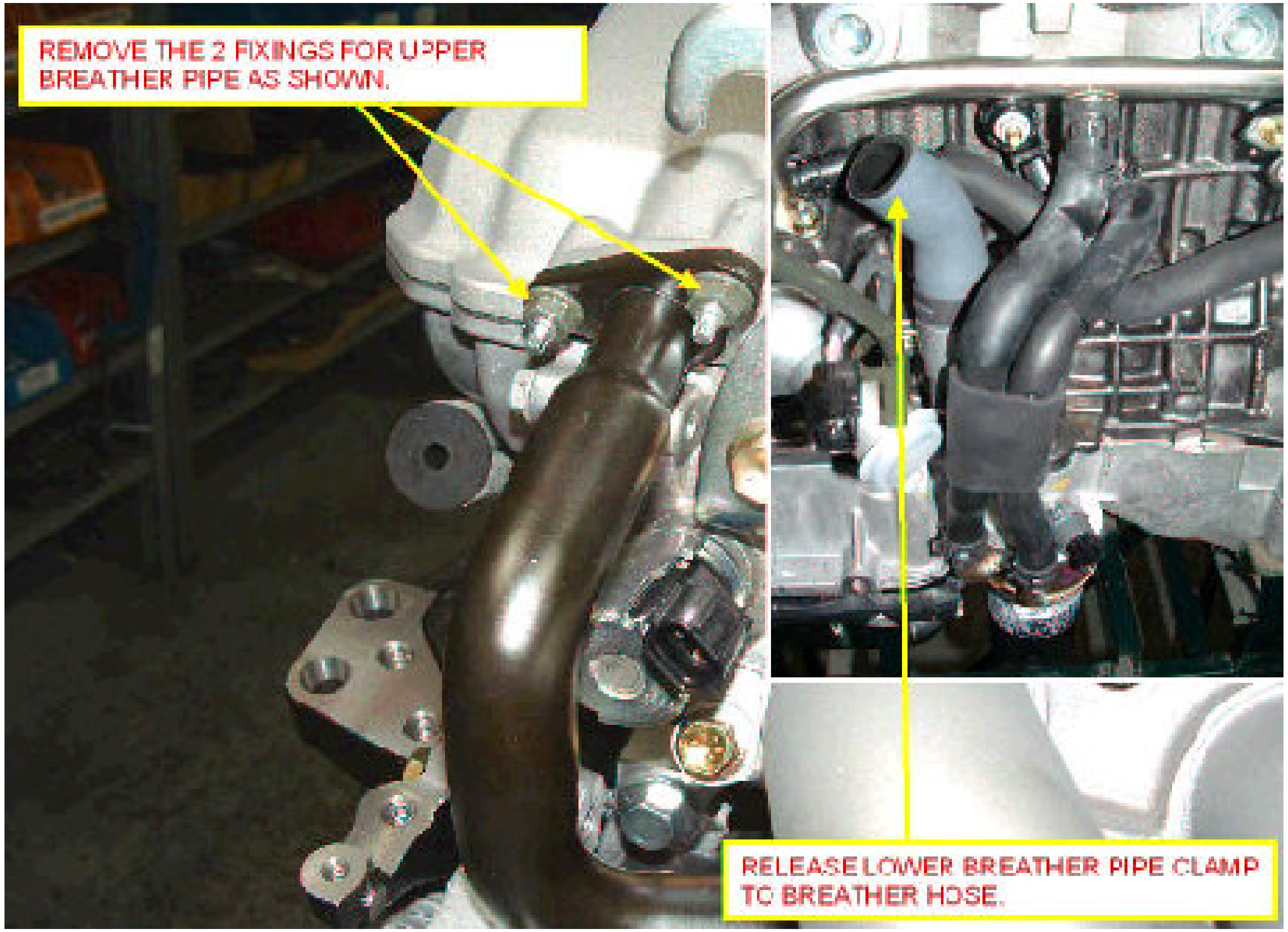
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING



SEQ	ACTIVITY – RHS Engine Mount
10	Remove the 4 fixings that secure the upper exhaust manifold and place fixings and heat shield to one side for re-fitment.
20	Remove the 2 outside nuts that secure the exhaust manifold to the engine and place to one side. Slacken off the remaining 3 bolts so that they are very loose but do not remove.
30	Undo fixing that secures the bracket for the ERG rail. Remove fixing and place aside for re-fitment.
40	Using a small screwdriver lock off the water pump pulley using one of the 4 small holes on the face of the pulley. Undo and remove 4 fixings that retain the pulley to the pump shaft. Place 4 fixings and pulley to one side for re-fitment.
50	Remove the the engine wiring harness, ecm and backing plate from the vehicle. If applicable Flash ECM and fit new decals to ECM. Note: earlier cars will require a new ECM sold separately.
60	Attach engine hook to engine, and support the engine weight on hoist.
70	Undo 4 fixings for RHS engine hydro mount. Remove engine mount and place aside. Note: engine mount may have a surcharge applicable.
80	Collect modified engine mount. Fit engine mount to engine with previously removed fixings. Apply locite 5910 to upper left fixing and torque tighten fixings using specified torque wrench. Green paint mark head of fixing bolts.

CAREPOINT	QUALITY STANDARD

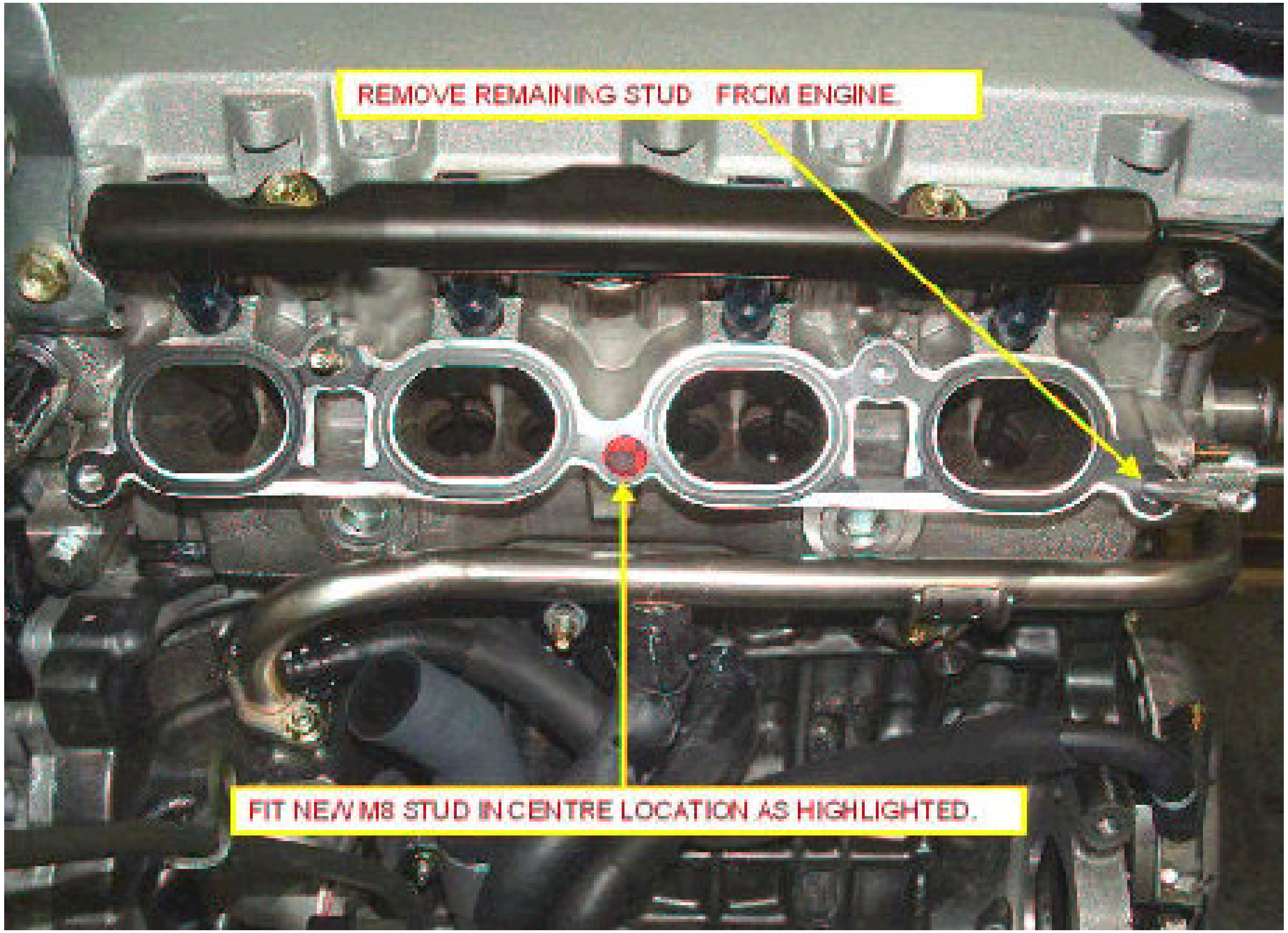
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
80	N/A	Torque / Tooling Reference	-	-	52Nm	
80	N/A	Loctite 5910	-	-	-	



SEQ	ACTIVITY – CAM COVER BREATHER
10	Undo 2 fixings that secure the breather pipe to the cam cover. Place fixings aside for re-fitment.
20	Using hose clamp pliers, release clip that secures the upper breather pipe to the lower breather hose.
30	Remove the cam cover breather hose and discard.

CAREPOINT	QUALITY STANDARD

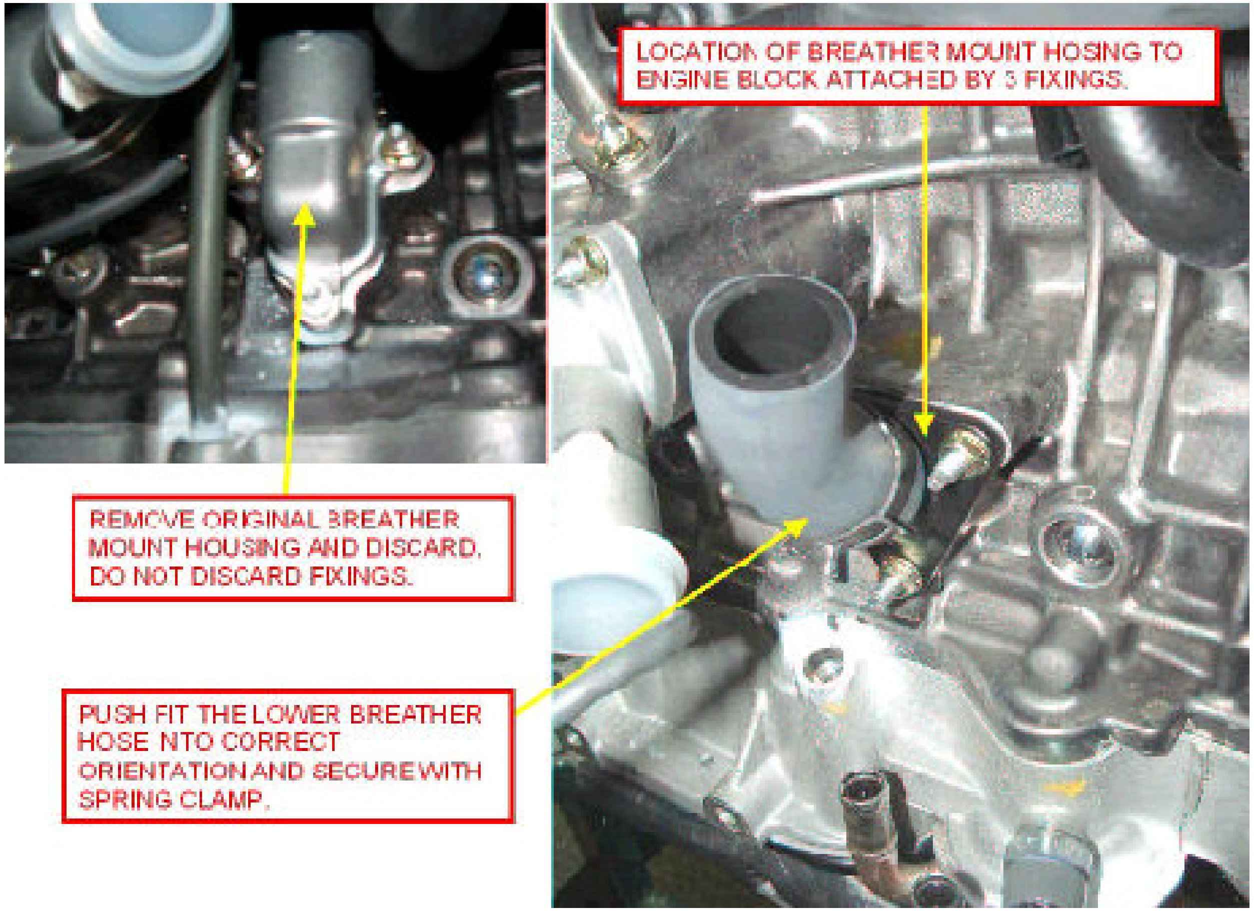
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	N/a	Torque / Tooling Reference	-	-		Hose Clamp Pliers



SEQ	ACTIVITY – MANIFOLD STUD
10	Remove the 2 studs that are situated in the fixing locations for the inlet manifold. Once removed discard fixings.
20	Collect M8 stud and fit into centre location on the engine.
30	Torque tighten fixing to specified torque
40	Green paint mark head of fixing once correct torque has been achieved.

CAREPOINT	QUALITY STANDARD

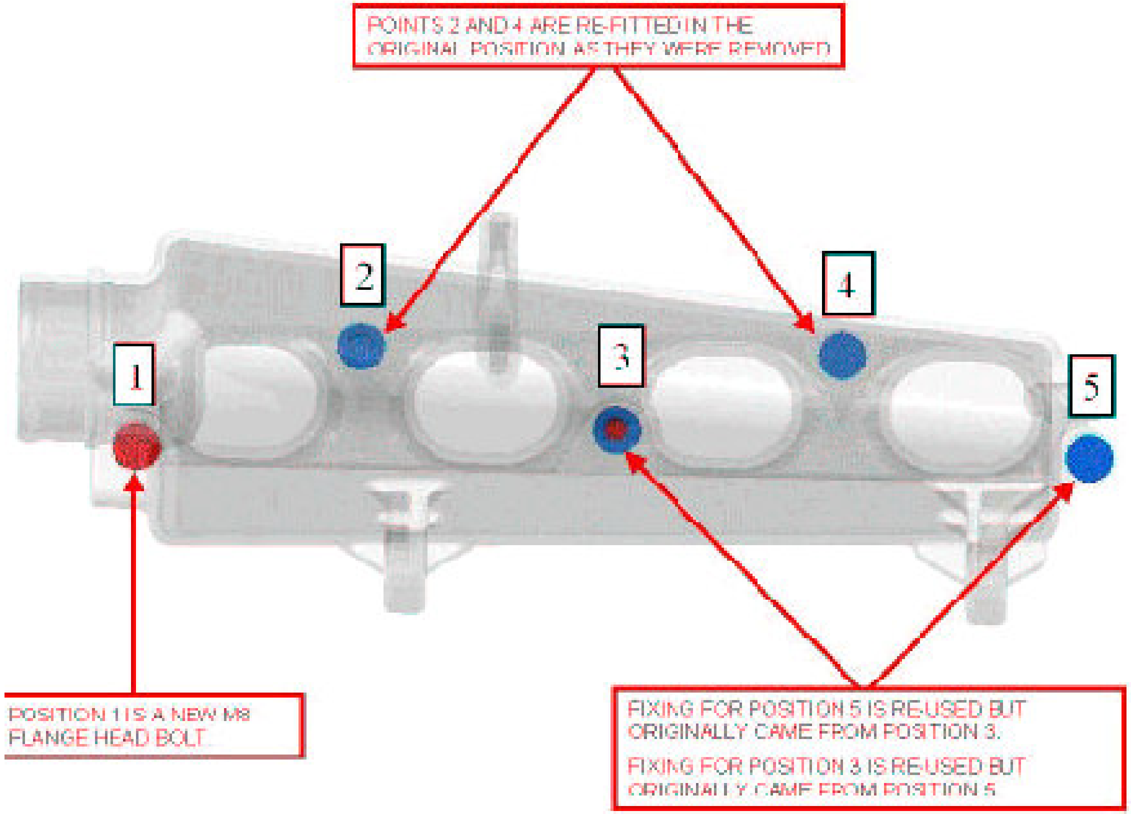
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	B111E6081S	M8 Stud	-	-		Torque wrench
30	N/a	Torque / Tooling Reference	-	-	10Nm	Torque wrench



SEQ	ACTIVITY – BREATHER MOUNT & HOSE
10	Remove lower section of breather hose with hose clamp pliers that is attached to the breather mount housing. Place hose aside with spring clamps.
20	Undo the 3 fixings that secures the breather mount housing to the engine block. Once removed place fxings aside for re-fitment.
30	Remove breather mount housing from engine and discard
40	Collect new breather mount bracket
50	Fit breather mount to engine block where discarded one was fitted. Using 3 fixings from previous, fit housing to engine block. Torque tighten fixings to specified torque
60	Green paint mark head of each fixing once correct toirque has been achieved.
70	Collect prevously removed lower breather hose. Proceed to remove 10mm from each end of the hose using hose cutters.
80	Push fit the lower breather hose into correct orientation, this will be judged by the position of the upper brather pipe to cam cover.
90	Secure breather hose to breather mount using the clamp on the hose.

CAREPOINT	QUALITY STANDARD

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	N/a	Torque / Tooling Reference	-	-	-	Hose clamp pliers
40	CLS30058F	Breather mounting block	1	-	-	-
60	N/a	Torque / Tooling Reference	-	-	10Nm	Torque
80	N/a	Torque / Tooling Reference	-	-	-	Hose cutters
100	N/a	Torque / Tooling Reference	-	-	10Nm	Hose clamp pliers



SEQ	ACTIVITY – FIT NEW INLET MANIFOLD
10	Collect new inlet manifold
20	Collect all relative fixings required for operation and apply permabond A130 to threads of 3 off M8x30 Flange head bolts, also to flange head unit.
30	Fit new gasket and inlet manifold to engine using the fixings specified.
40	Using 3 off M8X30 flange head bolts fit into 2 upper fixings locations and lower left fixing.
50	Fit flange head nut to lower centre location onto stud.
60	Do not apply permanbond to the M8x40 flange head bolts as this has to be left loose. Do not tighten (B indication). Hand fit into lower right fixing position to aid alignment of the inlet manifold.
70	Torque tighten fixings to specified torque
80	Once fixings have been torque tightened, remove the M8x40 flange head bolt and place aside for refitment. (B indication)
90	Using specified torque wrench torque tighten the single fixing that secures the VVT valve to the head
100	Green paint mark the head of each fixing once correct torque has been achieved.
110	Fit new engine wiring harness to engine. This follows the same routing with the exception of around the inlet area for the Main Inlet Manifold. Here the loom needs to fit between the Breather Pipe (not yet fully fitted) and the Inlet Manifold. Follow a tight line down beside the Cylinder Head and Block to the back of the Alternator.

CAREPOINT	QUALITY STANDARD

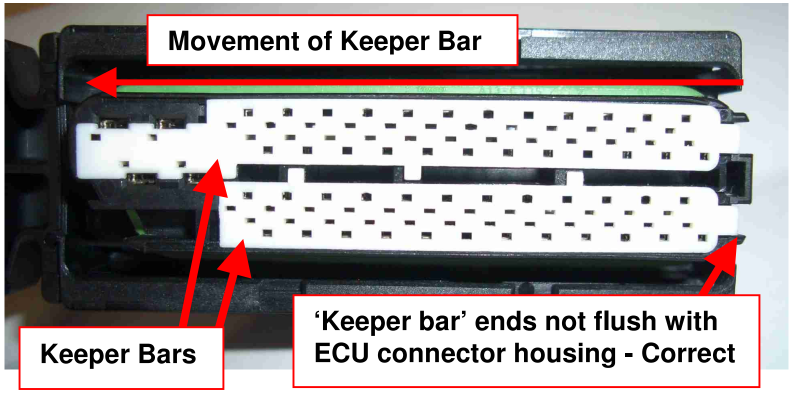
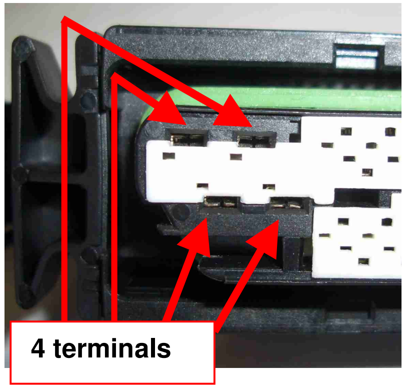
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	BLS3E6042J	Assy Supercharger Inlet Manifold	1	-	-	-
20	ALS3E6026F	M8x30 Flange head bolt	3	-	-	-
20	A120E6325S	M8 X 40 bolt	1			
20	ALS3E6327F	flange head unit	1	-	-	-
30	A120E6342S	Inlet Manifold Gasket	1	-	-	-
20	-	Sealant Permanbond A130 (BLUE)	0.01	-	-	-
70	N/a	Torque / Tooling Reference	-	-	27Nm	Torque
90	N/a	Torque / Tooling Reference	-	-	10Nm	Torque

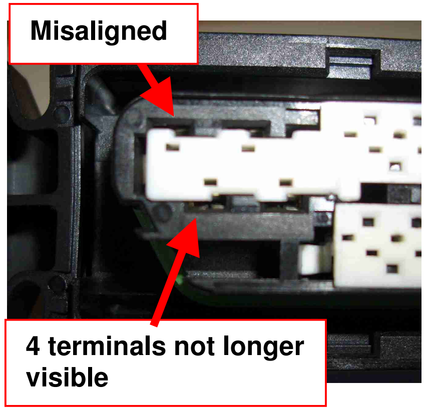
Technical Bulletin CUP240/02 – Class 3.

ENGINE HARNESS (ALS3M0011K) INFORMATION BULLETIN

January 2006

Lotus Sport & Performance ENGINE HARNESS (ALS3M0011K) fitting recommendations. It is essential that up most care be taken when handling and fitting the engine harness ALS3M0011K. Electrical connectors, clips and terminals are delicate in nature and can be easily damaged. Please note the location of the ‘keeper bars’ (white plastic terminal housing) on the ECU connector, indicated below. Please check the harness and all connectors before fitting.

✓	 	 	**Visible Indications that the ‘Keeper Bar’ is Correctly Located** Both upper and lower ‘keeper bars’ should be checked to see that they are correctly position. The four terminals (shown) should be clearly visible and aligned. ‘Keeper bar’ ends should not be flush with ECU connector housing.

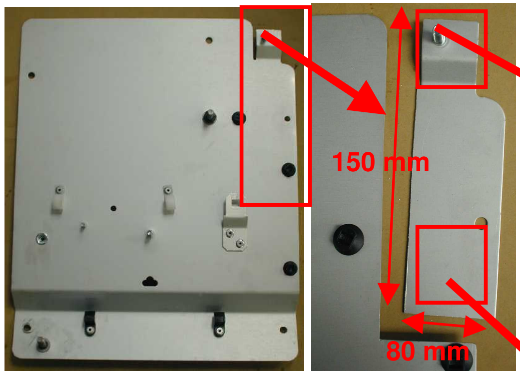
□	 	 	**Visible Indications that the ‘Keeper Bar’ is Incorrectly Located** Both ‘keeper bars’ have been ‘pushed’ out of location (away from the harness cable end) The four terminals shown above are no longer visible, and not aligned. ‘Keeper bar’ ends are flush with ECU connector housing.

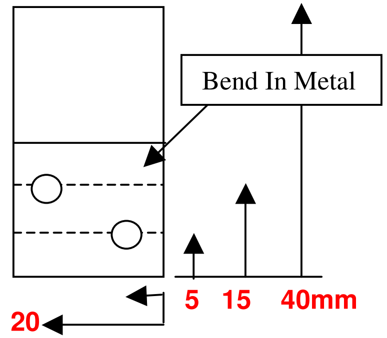


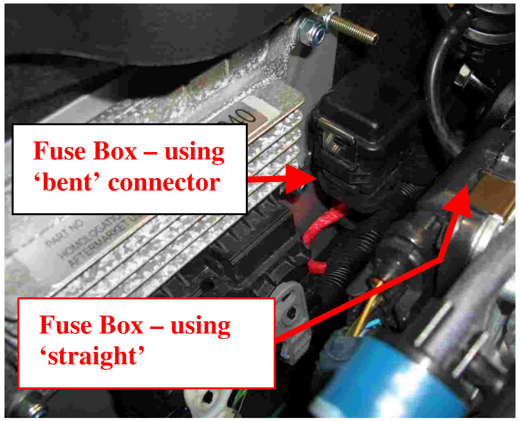
SEQ	ACTIVITY – RE-FIT FUEL RAIL
10	Obtain Supercharged Engine harness storage position ready for fitment to engine.
20	20 Locate harness to engine so portion of harness with Injector breakouts is positioned in channel between inlet manifold and cylinder head with coil pack breakout of harness at gearbox end of cylinder head.
30	Manoeuvre harness so that breakouts for injectors are facing uppermost and are in line with injector ports in cylinder head.
40	Obtain fuel rail removed earlier
50	Remove injectors from fuel rail and place into injector ports ensuring that seals are seated correctly.
60	Fit fuel rail onto top of injectors ensuring that the injectors are seated correctly into the fuel rail.
70	Align fixing holes in fuel rail with fixing holes in cylinder head, Thread 2x M8 Fixings retained in through holes in fuel rail and hand start into cylinder head.
80	Obtain M6 fixing removed earlier Thread fixing through hole in fuel pipe and hand start into threaded aperture on cam cover.
90	Using tools supplied, Torque tighten 2x M8 fixings to fully secure fuel rail to cylinder head.
100	Using tools supplied, Torque tighten M6 fixing to fully secure fuel pipe to cylinder head.
110	Once required torque's have been achieved, Green paint mark across head of each fixing.

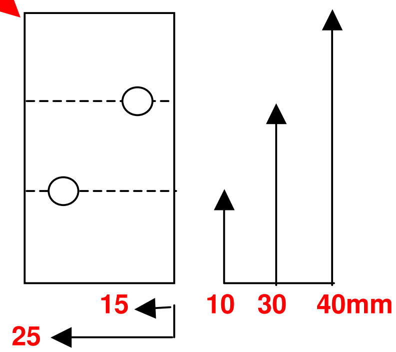
CAREPOINT		QUALITY STANDARD
30	Ensure that the injector seals are seated correctly when re-fitting the fuel rail	
70	Ensure that when the harness is being connected to the fuel rail plugs are clicked 'home'	
80	Ensure that when connecting harness that the plug is clicked 'home'	

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
50	A129E6000F	Injector	4	-	-	





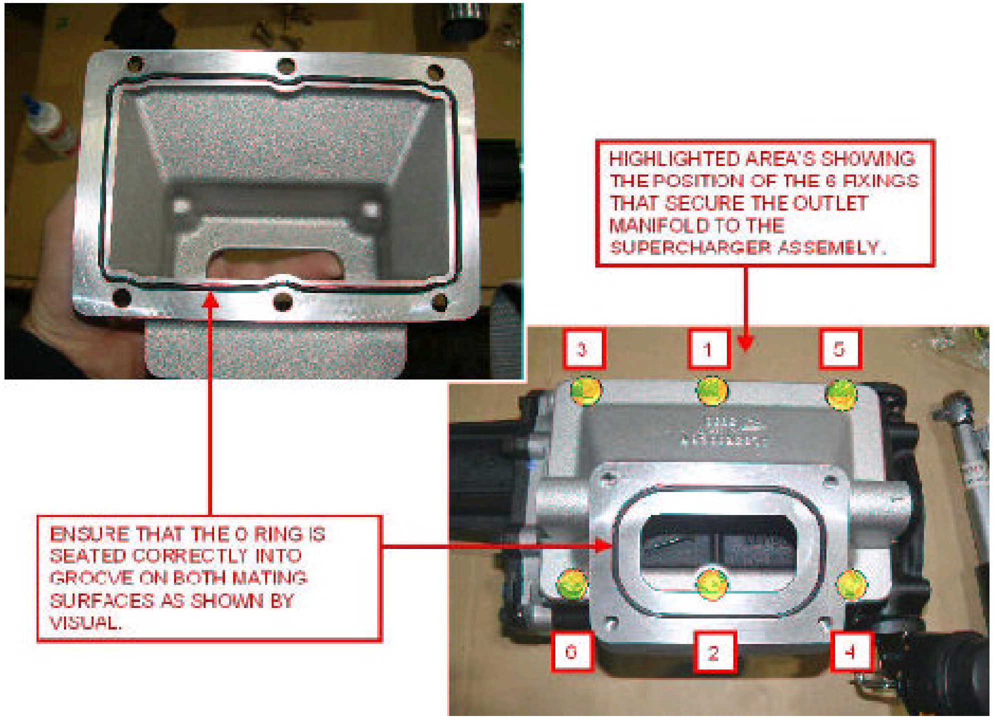




SEQ	ACTIVITY – ECM PLATE
	It is necessary to modify the ECM backing plate to accommodate the supercharger unit
10	Remove the ECM backing plate from the vehicle
20	Mark out an area starting from the upper right hand side of the backing plate, with dimensions 80mm from the right and 150 mm from the right hand top corner. Cut this section out as shown below, and keep intact as this will be used later.
30	Using the section that has been removed.
40	Drill an two holes through this small angled section, 10mm in from the left and 10mm up from the bottom, at 5mm and 10mm up respectively, as shown.
50	Bolt this angled section as shown
60	For the 2nd fuse/relay, bolt this to the further most inboard part of the ECM plate
70	Refit the ECM plate and all ancillaries, ECM (confirm correct calibration in ECM), as per the reverse order as was removed.

CAREPOINT		QUALITY STANDARD
70	Check that fuses/relays are secure, and that no fouling or interference is visible at any point in the installation. Check ECM contains the correct calibration	
70	See technical bulletin Cup240/002 at end of this document.	

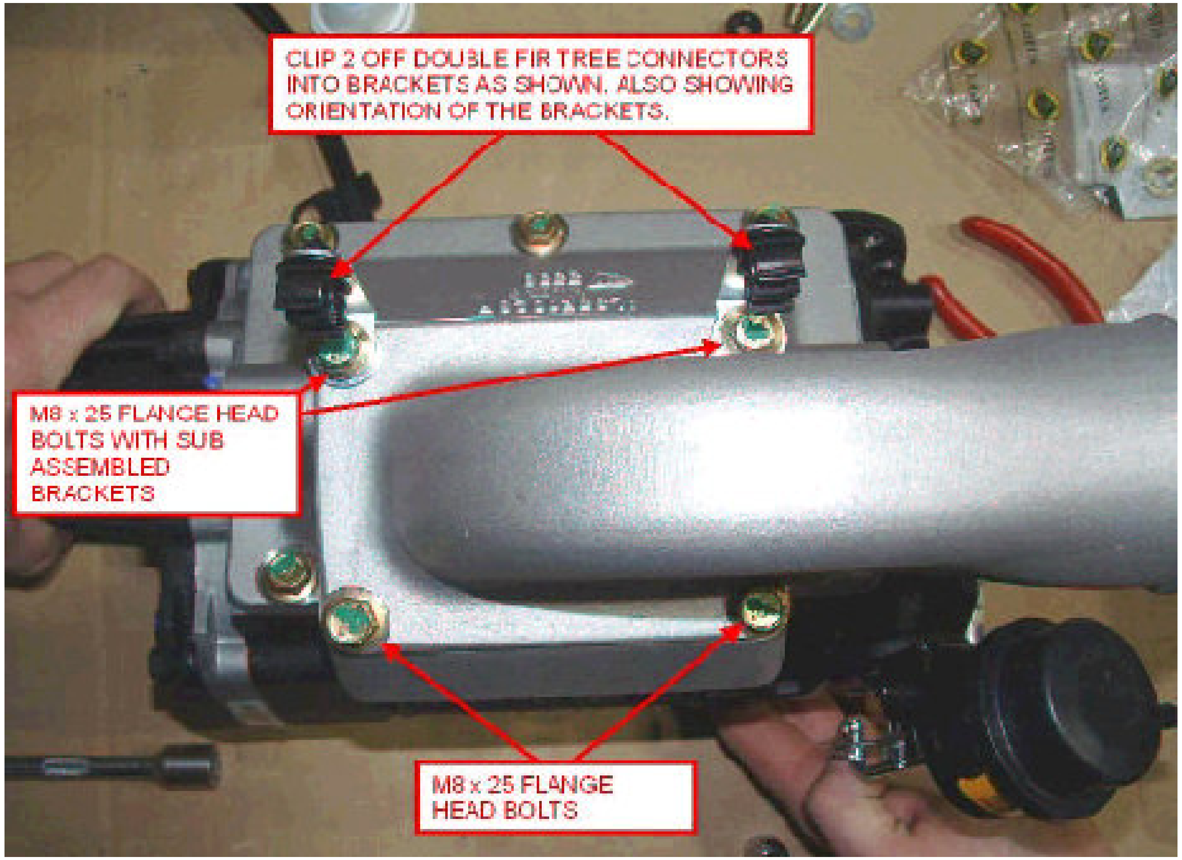
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
50						
20						
20						
20						



SEQ	ACTIVITY – SUB ASSEMBLY SUPERCHARGER - OUTLET
10	Collect parts required for operation, place on a suitable clean and tidy work surface
20	Using CLEAN PROCESS #1, clean area on both mating surfaces of the outlet manifold and the supercharger.
30	Cut 'o' ring to perimeter length for the face between the supercharger and supercharger outlet manifold. Make sure that ends of the 'o' ring are parallel, apply primer to the ends and super glue to join.
40	Fit outlet manifold to the supercharger using 6 off M8 x 25 fixings. Apply permabond to the threads of fixings. With fixing 2, apply permabond the full length of the thread.
50	The outlet manifold should be fitted with he port face facing away from the supercharger nose i.e. towards the front of the vehicle when in situ.
60	Torque tightens fixings in correct sequence and to specified torque. Green paint mark the head of each fixing once torque has been achieved.
70	Using CLEAN PROCESS #1, clean surface of the outlet manifold port that mates with the supercharger outlet port.
80	Cut 'o' ring to perimeter length for the face between the swan neck and supercharger outlet manifold. Make sure that ends of the 'o' ring are parallel, apply primer to the ends and super glue to join and fit.

CAREPOINT		QUALITY STANDARD
30	Ensure that 'o' ring is seated correctly into groove of outlet manifold	
40	Ensure that the 'o' ring stays correctly seated into groove when mating surfaces. Ensure that permabond is applied to fixing 2 the full length of the thread.	
80	Ensure that the 'o' ring is correctly seated into groove	

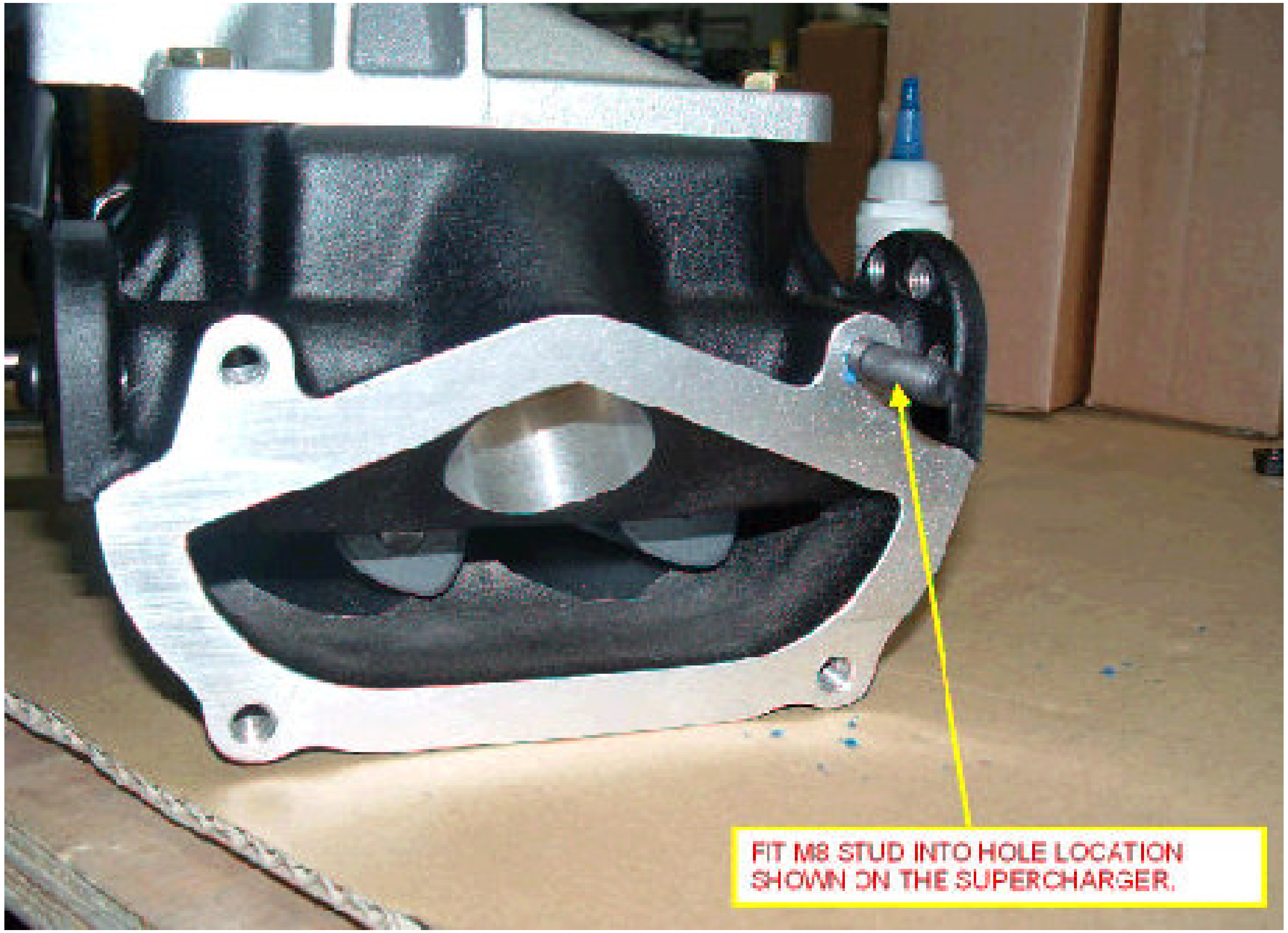
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	BLS3E6042J	Assy Supercharger	1	-	-	
20	-	Betaclean – 3900	0.05	-	-	
20	ALS3E0029F	Supercharger – Outlet Manifold	1	-	-	
30	ALS3E6069F	'o' ring Supercharger outlet	1	-	-	
60	N/A	Torque / Tooling reference	-	-	25Nm	Torque wrench
70	-	Betaclean – 3900	0.05	-	-	
80	ALS3E6069F	'o' ring Swan Neck	1	-	-	



SEQ	ACTIVITY – SUB ASSEMBLY SUPERCHARGER – SWAN NECK
10	Collect required parts
20	Sub assemble the two brackets to the 2 longer flange head bolts
30	Fit the outlet manifold port to the supercharger outlet manifold using 2 off M8 x 25 and 2 off M8 230 flange head bolts.
40	Torque tighten fixings to specified torque
50	Green paint mark the head of each fixing once correct torque has been achieved
60	Clip the 2 off double fir tree connectors into the brackets attached to the outlet port.

CAREPOINT		QUALITY STANDARD
20	When fitted ensure that they run along side of the supercharger7	
30	Ensure that the fitted outlet bore of the ports points away form the supercharger nose	
40	Ensure that 'o' ring is intact and correctly positioned	

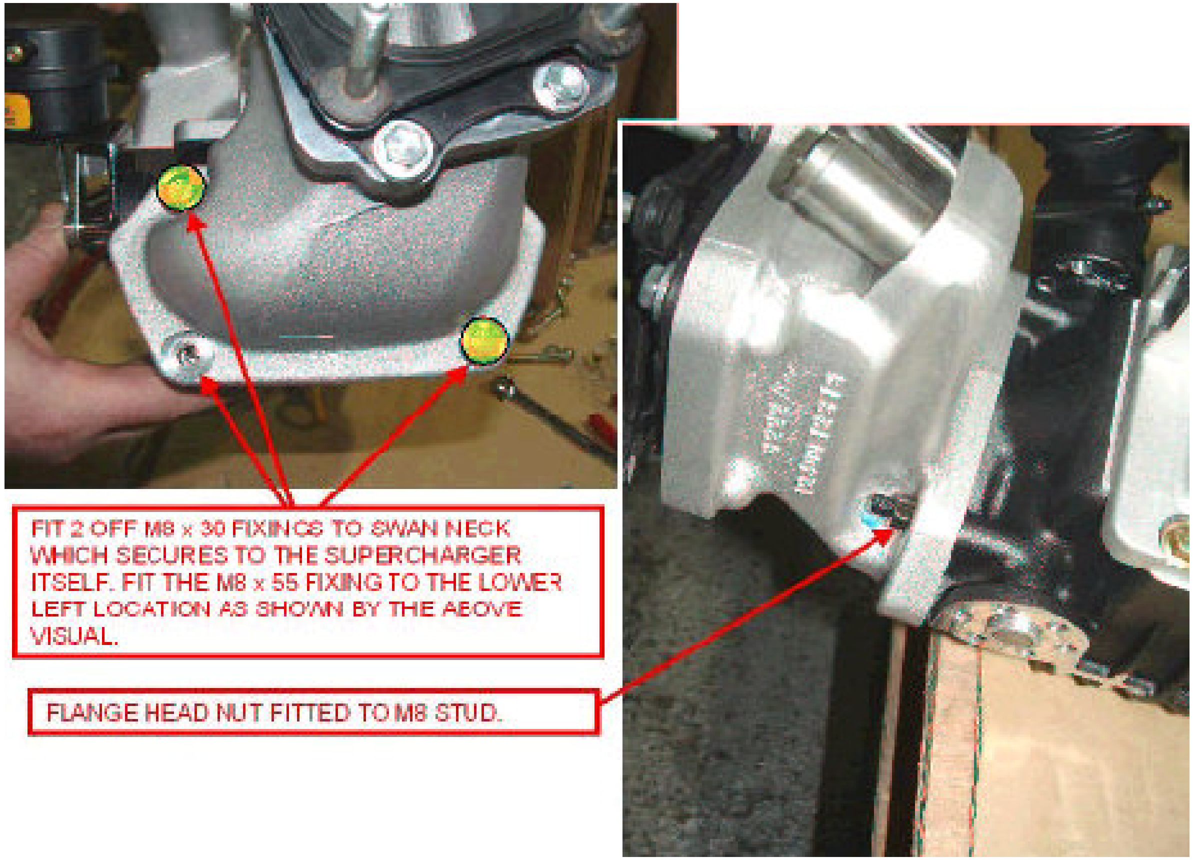
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	ALS3E0029F	Supercharger Outlet Port Machining	1	-	-	-
20	-	Torque / Tooling Reference	-	-	25Nm	Torque wrench
20	CLS3L0008F	Fuel Pipe Clips	2	-	-	-
60	A120E6324S	BOLT - FLANGE HEAD M8 X 25mm	4			



SEQ	ACTIVITY – M8 STUD TO SUPERCHARGER
10	Fit M8 stud into fixing location
20	Torque tighten fixing to specified torque
30	Green paint mark head of fixing once correct torque has been achieved.

CAREPOINT	QUALITY STANDARD
30 Ensure that O ring is fitted correctly onto dipstick tube	

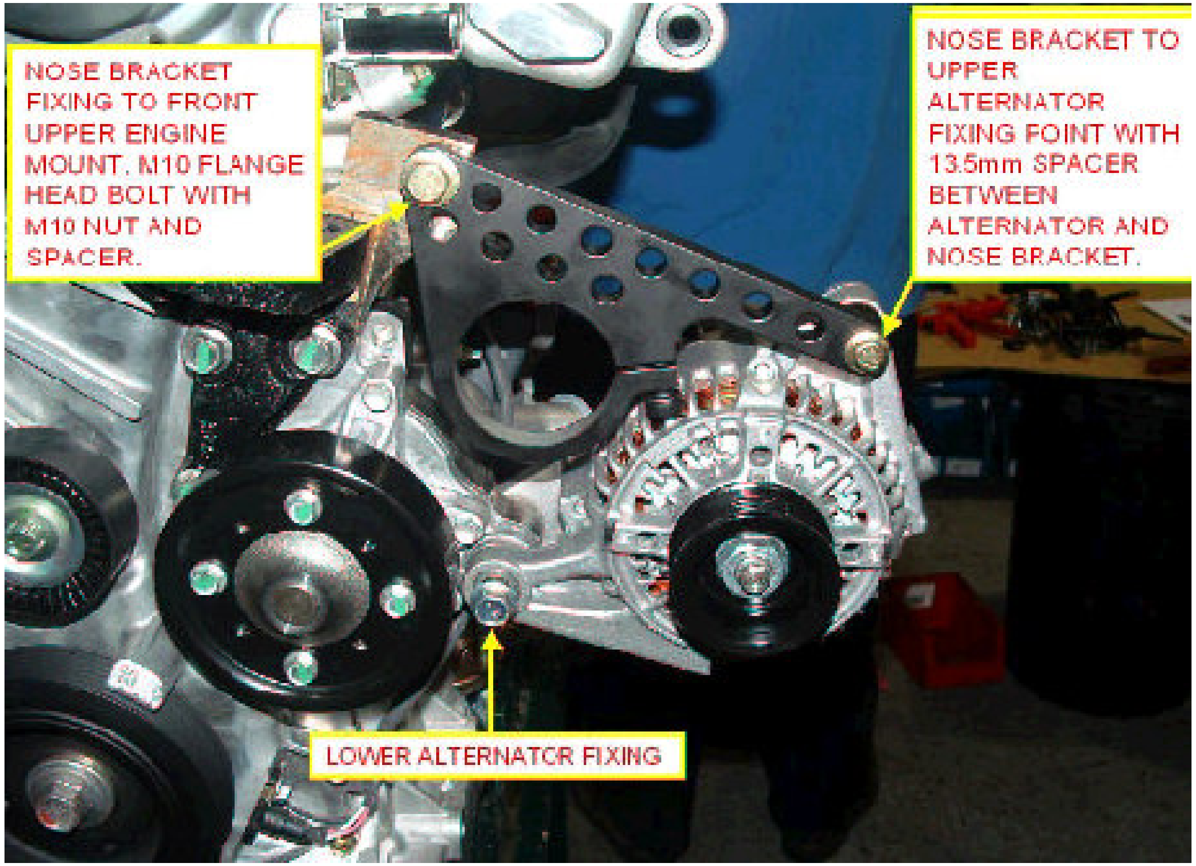
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	N/A	Torque / Tooling Refernce	-	-	25Nm	Torque wrench
10	B111E6081S	Stud, M8	1	-	-	



SEQ	ACTIVITY – SUB ASSEMBLY SUPERCHARGER – INLET MANIFOLD
10	Collect all parts and fixing required for operation and place on work surface.
20	Using CLEAN PROCESS #1, clean area on mating surfaces between supercharger inlet manifold and the rear of the supercharger
30	Cut ‘o’ ring to perimeter length for the face between the supercharger and supercharger inlet manifold. Make sure that ends of the ‘o’ ring are parallel, apply primer to the ends and super glue to join.
40	Fit ‘o’ ring into groove on the supercharger inlet manifold ensuring that the ‘o’ ring is seated correctly into the groove.
50	Fit the supercharger inlet manifold to the rear of the supercharger using 2 off M8 x 30 x 1.25 Flange head bolts and 1 off nut for stud fixing.
60	Leave the lower left bolt fixing out. This is to be fitted later. Torque tighen 3 fixings to specified torque
70	Green paint mark the head of each fixing once correct torque has been achieved.
80	Fit 7mm supercharger nose spacer to supercharger nose ensuring that it is pressed until it firmly butts up against the back plate.

CAREPOINT		QUALITY STANDARD
30	Ensure that ‘o’ ring is seated correctly into groove	
50	Do not tighten fixing.	

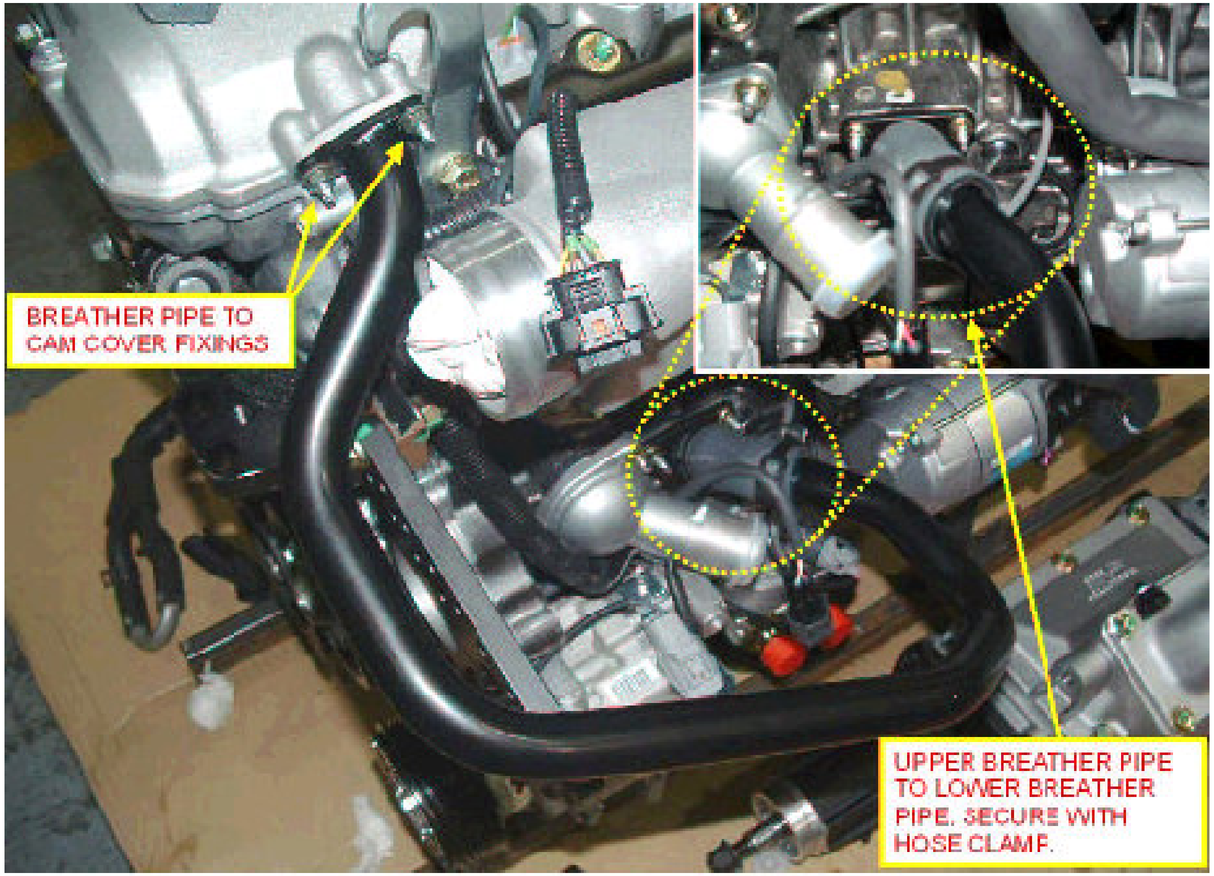
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	CLS3E0031J	Assy Supercharger – In Swan Neck	1	-	-	
20	ALS3E6069F	‘O’ Ring Outlet Port	1	-	-	
20	ALS3E6072F	BOLT M8 X 1. 25 X 55 HEX FLANGE	1	-	-	
50	ALS3E6062F	BOLT- M8 X 30mm FLG HD	2			
70	-	Torque / Tooling Refernce	--	-	10Nm	Torque wrench
60	ALS3E0063F	7m Spacer – Supercharer Nose	1	-	-	



SEQ	ACTIVITY – REFIT ALTERNATOR
10	Collect parts required for operation.
20	Re- fit the alternator but fitting the lower fixng only. Fixing to be used is what was previously removed. Tighten the fixing hand tight only.
30	Fit nose bracket to the front upper engine mount using a M10 x 50 flange head bolt and a M10 flange nut. Leave hand tight.
40	Fit the other end of the nose bracket to the upper alternator mount using the 13. 5mm spacer and a M8 x 55 flange head bolt. Leave hand tight. Tighten the lower alternator fixing to specified torque and loctite.
50	Torque tighten the front upper fixing from nose bracket to engine mount. This sets the position of the nose bracket.
60	Remove the fixing that secures the upper alternator to the nose bracket. Swing the alternator out of the way. The nose bracket should not move.
70	Green paint mark the head of each fixing once correct torque has been achieved.

CAREPOINT	QUALITY STANDARD
30 Ensure that O ring is fitted correctly onto dipstick tube	

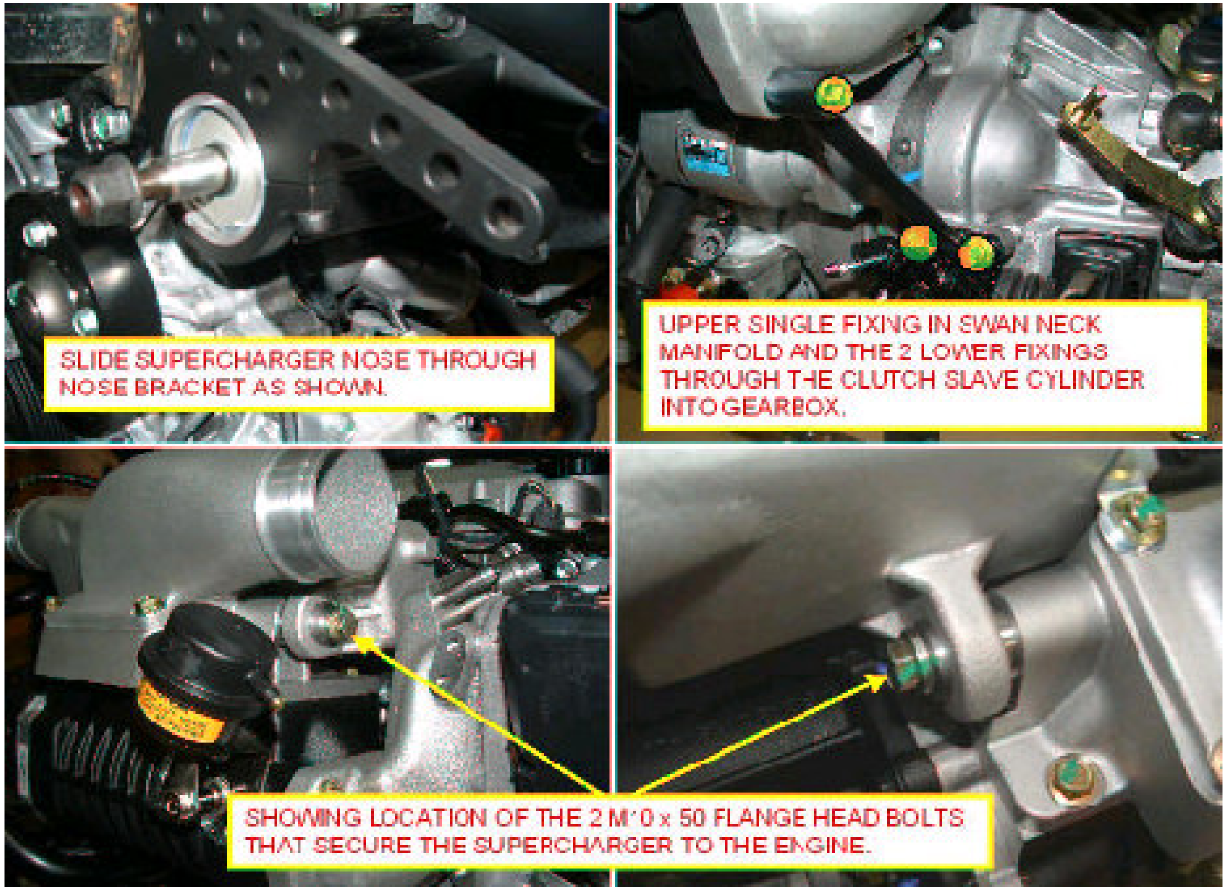
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
30	-	Bolt M10 X 50 Hex Flange	1	-	-	
30	-	Nut - M10 Flanged	1	-	-	
30	-	Bolt M8 X 1. 25	1	-	-	
30	-	Brkt Nose Mtg	1	-	-	
40	-	Bolt M10	1	-	58Nm	Torque Wrench



SEQ	ACTIVITY – FIT CAM COVER BREATHER
10	Collect relevant fixings and parts required for operation
20	Using new breather pipe fit into lower section of rubber breather pipe.
30	Fit upper section of breather pipe onto 2 studs on cam cover. Using fixings previously removed secure pipe to cam cover. Tighten fixings.
40	Using hose clamp pliers secure lower breather hose to upper breather pipe with hose clamp

CAREPOINT	QUALITY STANDARD

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	BLS3E0055F	Tube breather	1	-	-	
20	-	Torque / tooling Reference	-	-	-	Hose Clamp Pliers

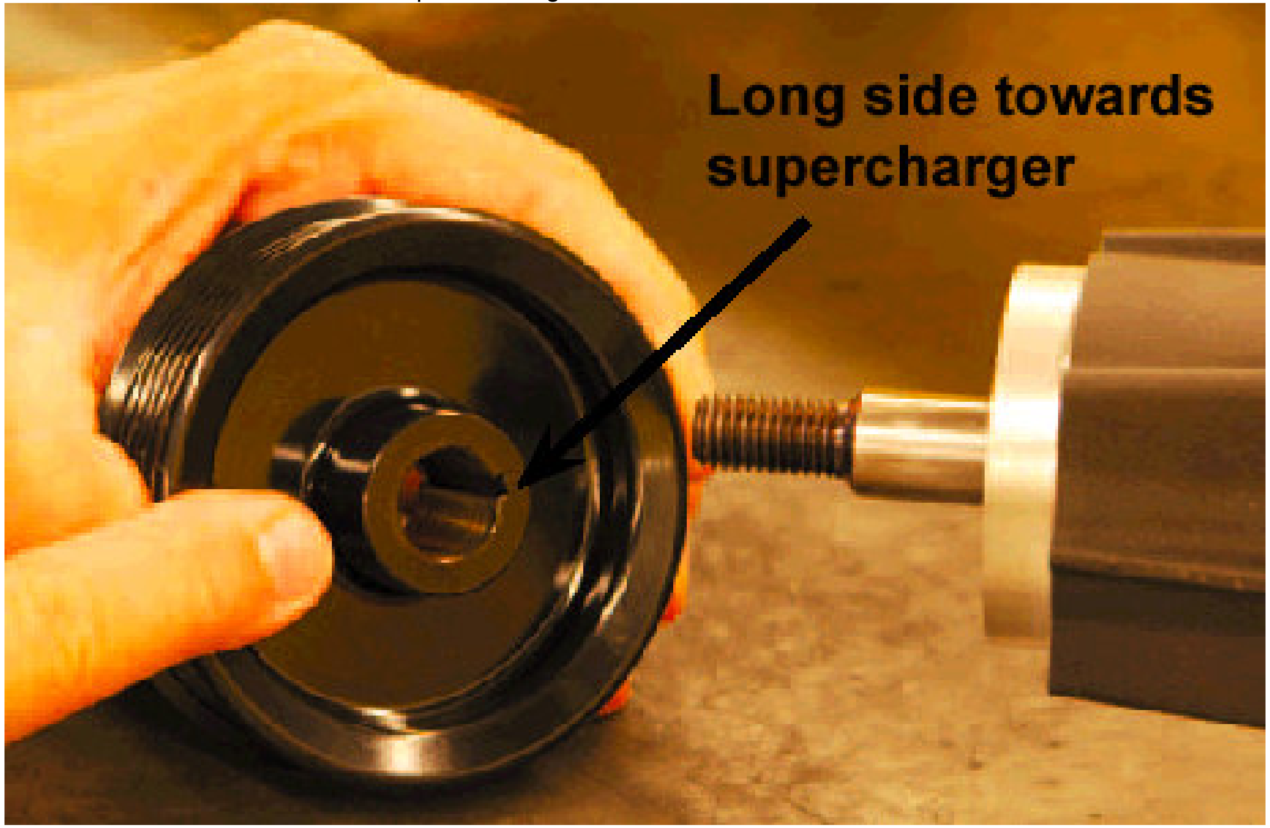


SEQ	ACTIVITY – FIT SUPERCHARGER TO ENGINE
10	Collect require parts for operation
20	Slide supercharger nose into the nose bracket, ensuring that its hard against the nose bracket. Secure using 2off M10 x 50 Flange head bolts with permabond A130. Do Not tighten.
30	Torque tighten the pinch bolt on the end of the nose bracket to specified torque ensuring that supercharger is still hard against the nose bracket.
40	Remove the bolts retaining the clutch slave cylinder but hold the slave cylinder in position, remove clamp bracket and clip. Discard bolts, clamp bracket and clip.
50	Loosely fit the supercharger support strut at the remaining hole on the swan neck manifold using M8 x 55 bolt and permabond A130
60	Using permabond A130 bolt the lower into position using the new longer M8 x 25 bolts Torque tighten the supercharger support strut bolts to specified torque
70	Carefully tighten the 2 off M10 x 50 flange head bolts evenly so that the 2 sliding bushes pull in together and clamp the supercharger equally
80	Torque tighten the M10 x 50 flange head bolts to specified torque
90	Green paint mark the head of each fixing once correct torque has been achieved

CAREPOINT	QUALITY STANDARD
30 Ensure that supercharger is hard against the nose bracket.	

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
30	-	Torque / Tooling Refernce	-	-	25Nm	Torque wrench
50	BLS3E0068F	Stay – Mounting Supercharger	1	-	-	
50	A120E6324S	Bolt, M8 X 25, Stay Mtg	2			
60	-	Sealant – Permabond A130 (BLUE)	0.01	-	-	
90	-	Torque / Tooling Refernce	-	-	25Nm	Torque wrench

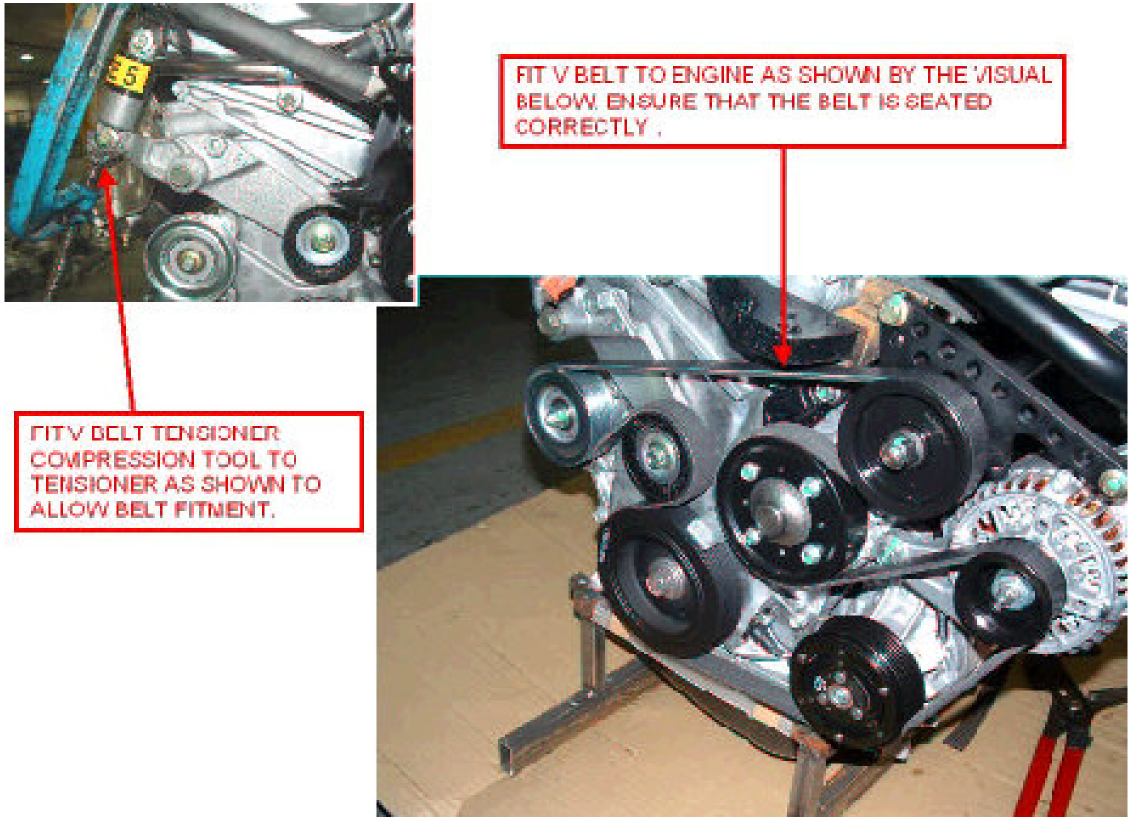
70	-	Torque / Tooling Refernce	-	-	50Nm	Torque wrench



SEQ	ACTIVITY – PULLEY SUPERCHARGER
10	On supercharger remove nose nut and place aside
20	Start the pulley installation by identifying the side of the pulley with the greater offset,or longer neck. This is the side that will go **towards** the supercharger.Align the keyway in the pulley bore with the key on the input shaft and place the pulley on the shaft.
30	Align the keyway in the pulley bore with the key on the input shaft
40	Fit the pulley onto the shaft keeping the ley and key way aligned
50	Fit the previously removed nut, fit onto supercharger shaft to secure the pulley in postion with a strap wrench
60	Torque tighen the retaining nut that secures the pulley to specified torque
70	Green paint mark the head of each fixing once correct torque has been achieved

CAREPOINT		QUALITY STANDARD
20	Do not use a hammer or mallet to install or remove the pulley onto the shaft, as this will damage the supercharger!	
50	Be careful not to damage the supercharger pulley while fitting the strap wrench	

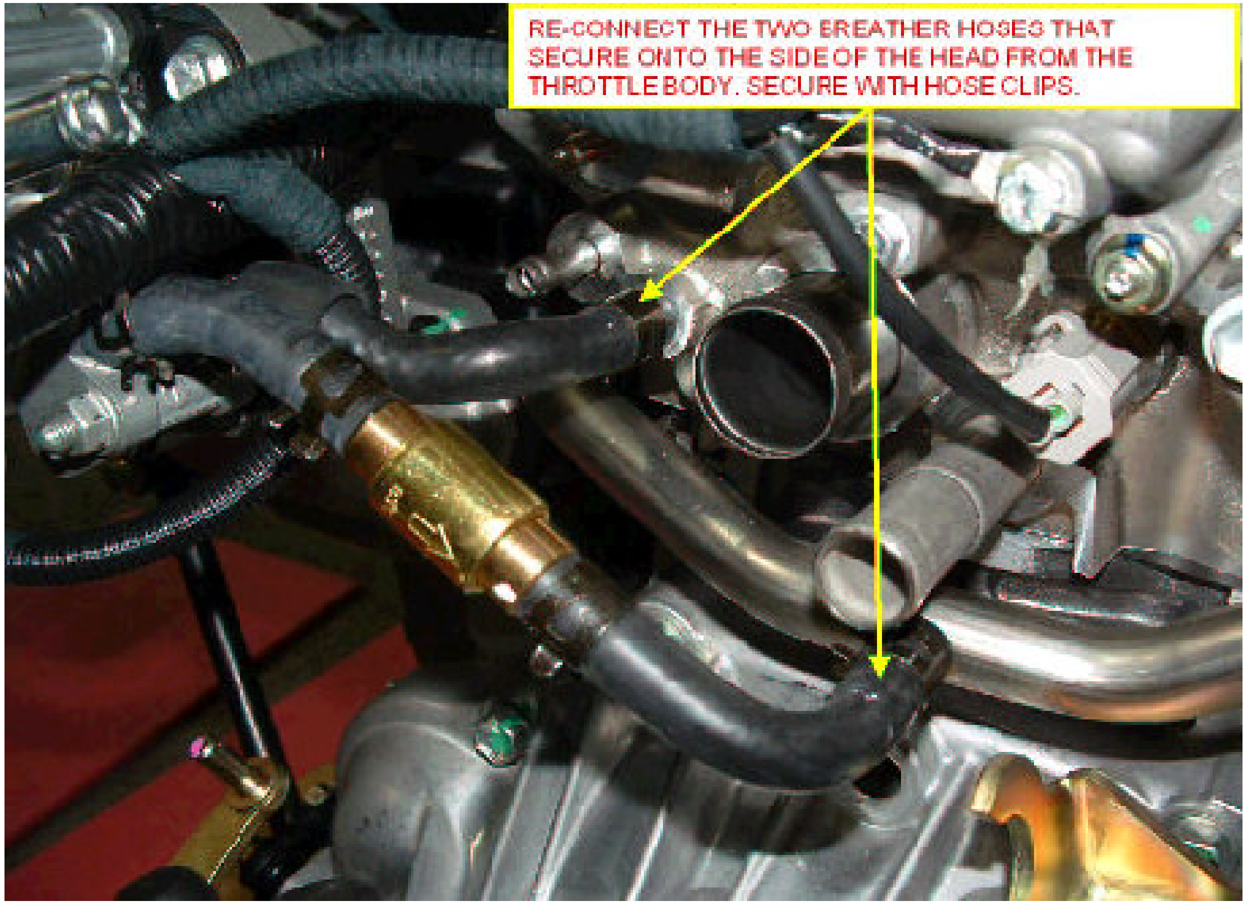
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	BLS3E6042J	Pulley	1	-	-	
50	-	Torque / Tooling Refernce	-	-	-	Strap wrench
70	-	Torque / Tooling Refernce	-	-	61Nm	Torque wrench



SEQ	ACTIVITY – FIT AUXILIARY V BELT
10	Obtain required parts for operation
20	Fit V belt tensioner comprssion tool to the belt tensioner
30	Collect V belt and fit to engine
40	Once belt is fitted, release V belt tensioner compression tool to allow V belt to correct tension
50	**NON AIR CONDITIONED VEHICLES** An additional Bracket for cars that do not have air conditioning is required. Before fitting the Auxiallary Drive Belt Bolt the Additional Bracket, using the 3x M8 x 16 Bolts, to the same holes as used to mount the Air Conditioning Unit. Then bolt the Pulley to the Bracket using the long bolt and Lock Nut supplied. Loctite and Torque to 27Nm.

CAREPOINT	QUALITY STANDARD
30 Ensure that the V belt is fitted as per visual and that it is seated correctly before releaseing tensioner	

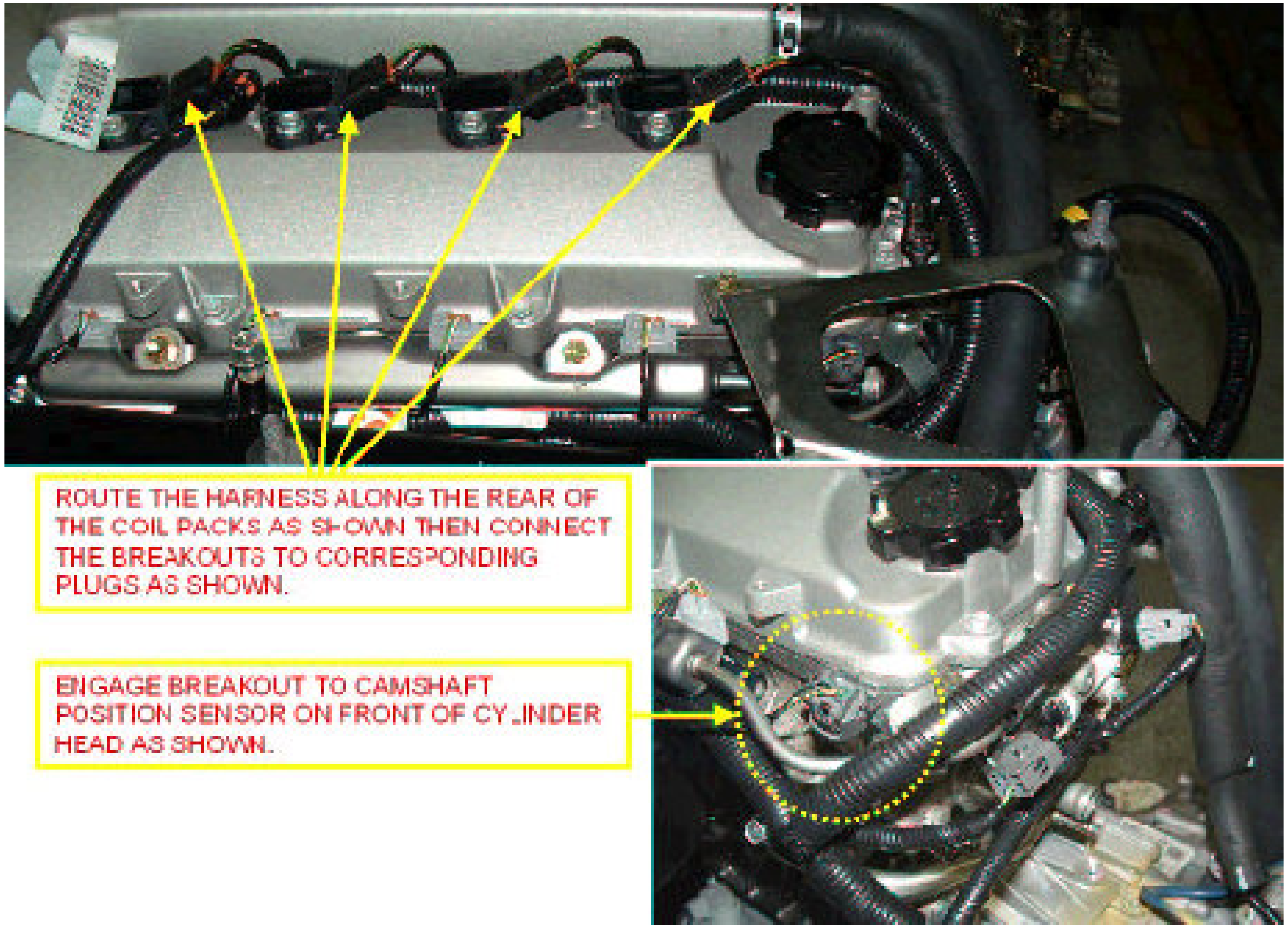
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	N/A	Torque / Tooling Refernce	-	-	-	V belt tensioned compression tool
30	ALS3E6021F	Belt, V Rated, A/C	1	-	-	
50	A120E6403S	Pulley	1	-	-	
50	A120E6404S	Bolt	1	-	-	
50	A120E6480S	Nut	1	-	-	
50	BLS3E0064F	Mounting Brkt, Pulley, Non Aircon	1	-	-	
50	A075W1036Z	Bolt, M8 X 16	3	-	-	



SEQ	ACTIVITY – RE-FIT BREATHER PIPES
10	Re-connect brather pipes that were previously disconnected from the side of the head on the engine
20	Push fit both hoses back onto location necks
30	Using hose clamps pliers re-fit the hose clamps that secure the hoses into position
40	Re- fit cam cover breather hose to throttle body where previously removed.
50	Connect cam cover breather hose to inlet manifold.

CAREPOINT	QUALITY STANDARD

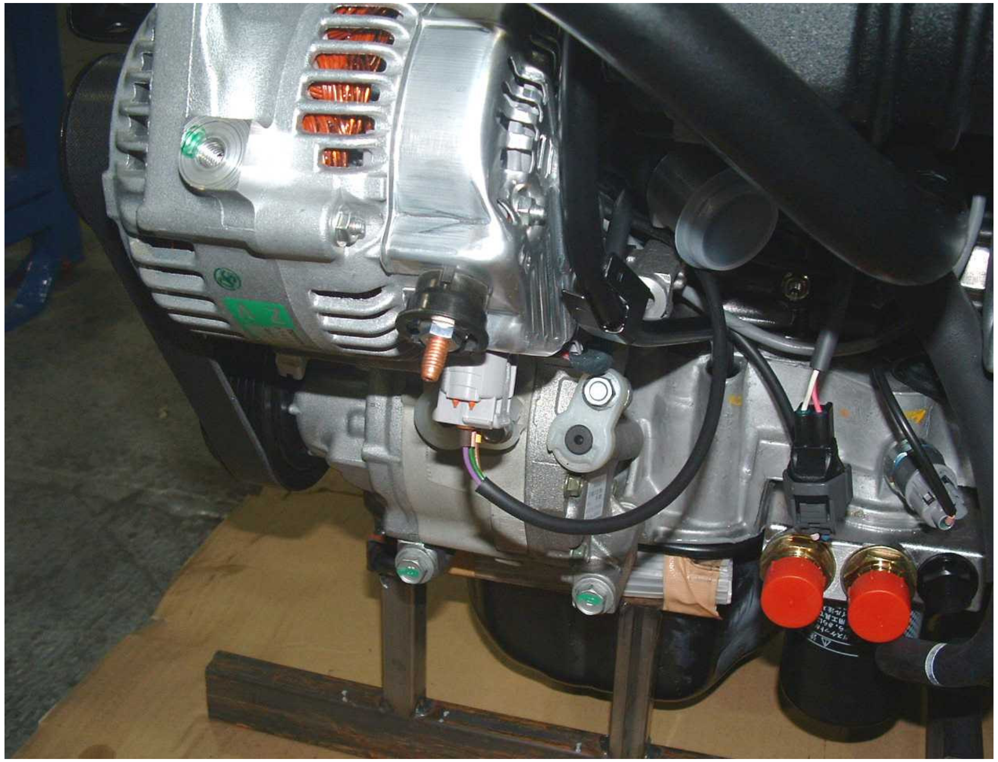
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
30	N/A	Torque / Tooling Refernce	-	-	-	Hose clamp pliers



SEQ	ACTIVITY – HARNESS WIRING, ROUTING & CONNECTORS
10	Obtain Coil Pack breakout from main harness at Oil Filler cap end of cylinder head.
20	Route coil pack breakout along side of cylinder head and into groove along camshaft cover ensuring harness is tucked neatly down between threaded studs and rear of groove.
30	Engage four connectors on harness breakout into plugs on corresponding coil packs on camshaft cover as shown in visual.
40	Obtain single breakout from main harness at oil filler cap end of fuel rail and engage into camshaft position sensor on front of cylinder head.
50	Obtain four connectors from portion of main harness under fuel rail and engage into plugs on corresponding injectors as shown in visual.
60	Obtain VVTI breakout from main harness at alternator end of fuel rail and engage into VVTI sensor on front of cylinder head.
70	There will be two remaining breakouts at alternator end of fuel rail, These are for Intercooler MAP sensor and EVAP canister, These will be connected later

CAREPOINT	QUALITY STANDARD

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING



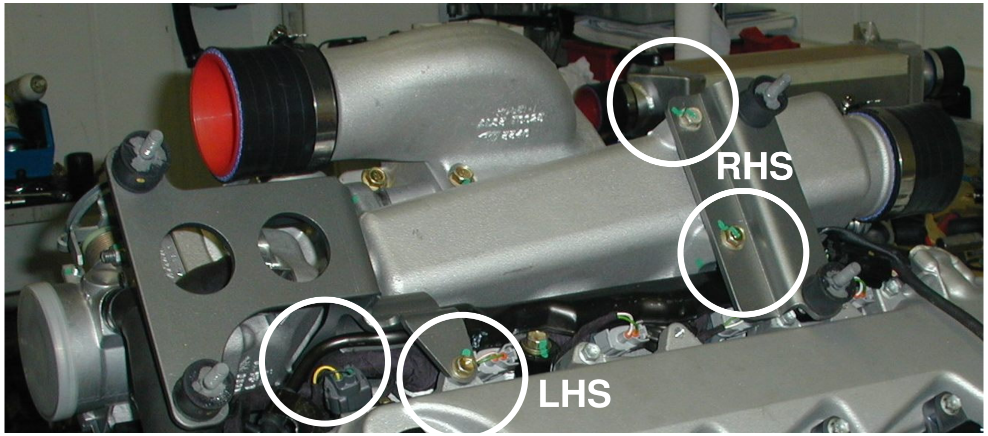
SEQ	ACTIVITY – ALTERNATOR ELECTRICAL CONNECTOR
10	Connect branch from the harness to the alternator. Make sure that the plug has clicked home

CAREPOINT	QUALITY STANDARD
10 Ensure that the plug has clicked home when connecting harness to alternator	

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING

SUPERCHARGER

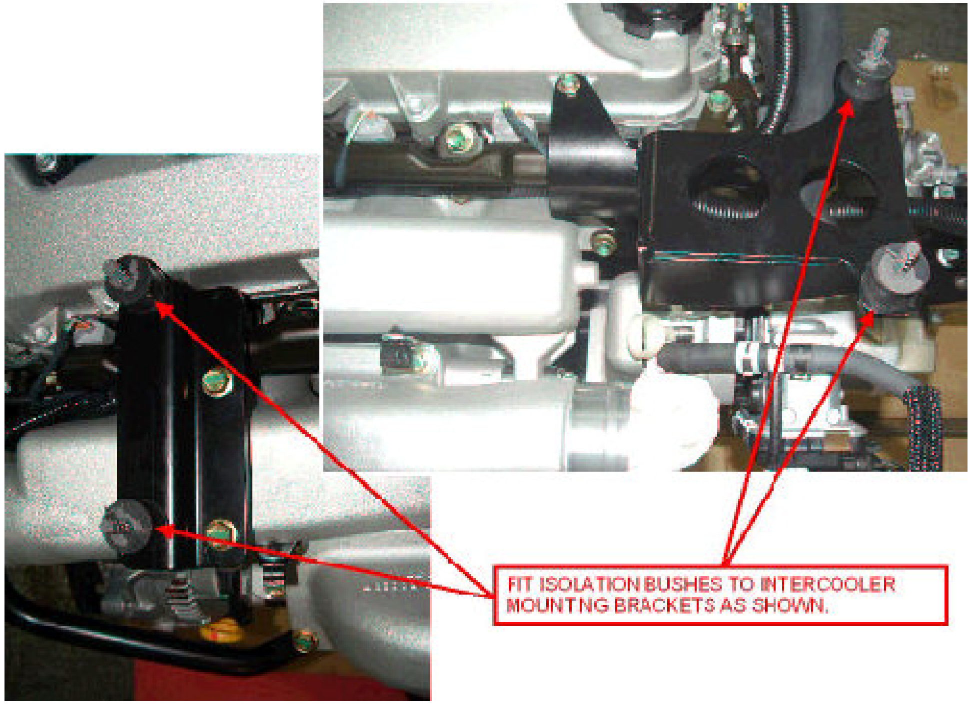
PROCESS SHEET



SEQ	ACTIVITY – INTERCOOLER BRACKETS
10	Collect required components for operation
20	Fit RHS intercooler bracket to the fixing points on the inlet manifold and cam cover
30	Secure bracket using 2 off M8 x 25 flange head bolts with permabond A130
40	Torque tighen 2 intercooler mount brackets to specified torque
50	Fit the LHS intercooler mount bracket to the inlet manifold and cam cover
60	Secure bracket to engine using 1 off M8 x 40 and 1 off M6 x 16 bolt with permabond A130
70	Torque tighen 2 fixings to specified torque
80	Green paint mark the head of each fixing once correct torque has been achieved

CAREPOINT	QUALITY STANDARD

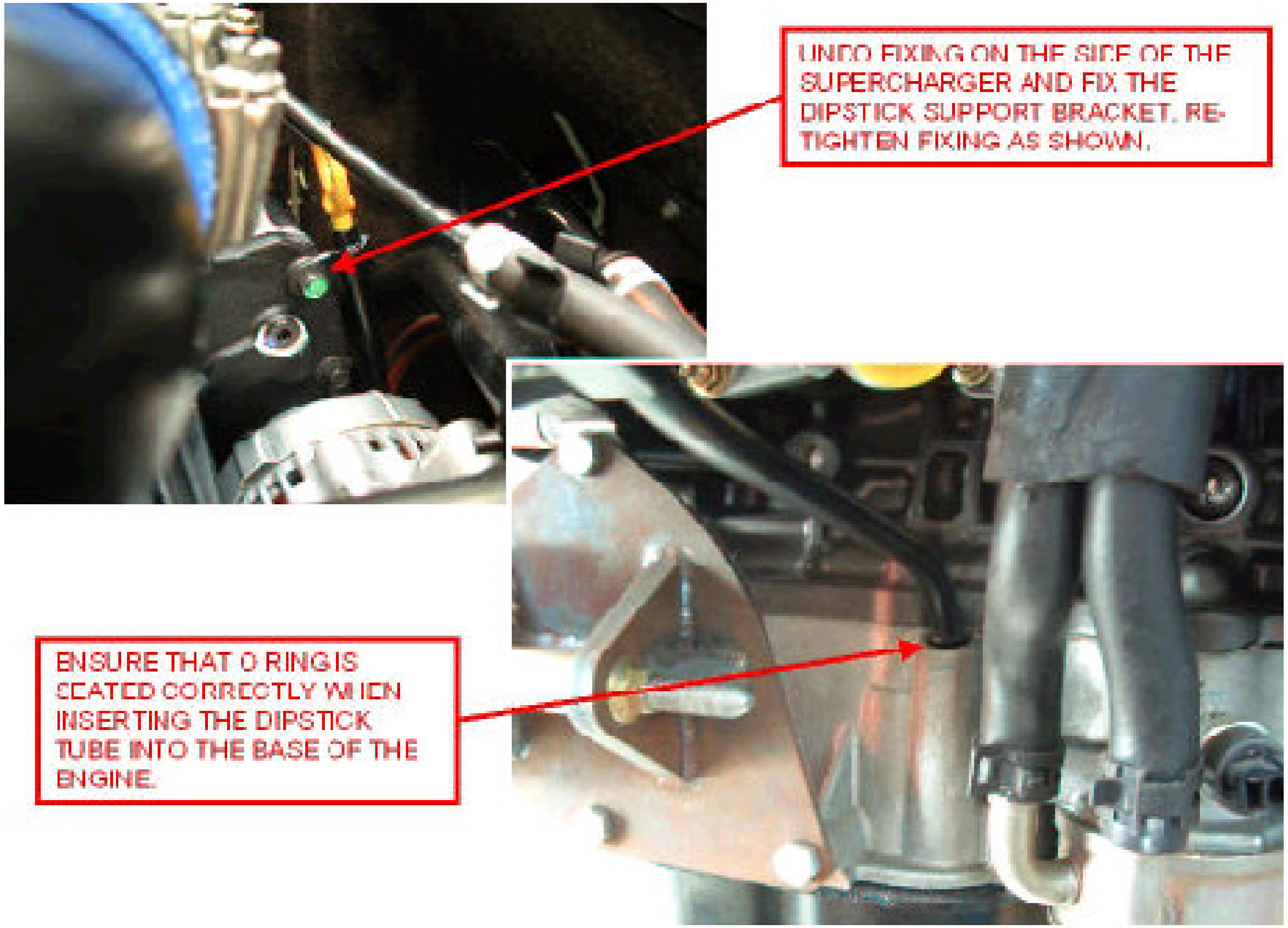
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	BLS3E0047F	Bracket Intercooler Mounting RHS	1	-	-	
30	A912E7033V	Sealant – Permabond A130 (BLUE)	0.01	-	-	
40	N/A	Torque / Tooling Refernce	-	-	27Nm	Torque wrench
50	CLS3E0048F	Bracket Intercooler Mounting LHS	1			
60	A912E7033V	Sealant – Permabond A130 (BLUE)	0.01	-	-	
70	N/A	Torque / Tooling Refernce	-	-	10Nm	Torque wrench
70	N/A	Torque / Tooling Refernce	-	-	27Nm	Torque wrench



SEQ	ACTIVITY – INTERCOOLER ISOLATION BUSHES
10	Collect required parts for operation from lineside storage position.
20	Fit 2 isolation bushes to the RHS intercooler-mounting bracket. Secure using 2 off spring washers and 2 nuts.
30	Tighten fixings to secure bushes to RHS intercooler mounting bracket.
40	Fit remaining 2 isolation bushes to the LHS intercooler mounting bracket
50	Secure in the same way using 2 off sprung washers and 2 nuts.
60	Tighten fixings that secure the LHS isolation bushes to the intercooler mounting bracket.

CAREPOINT	QUALITY STANDARD

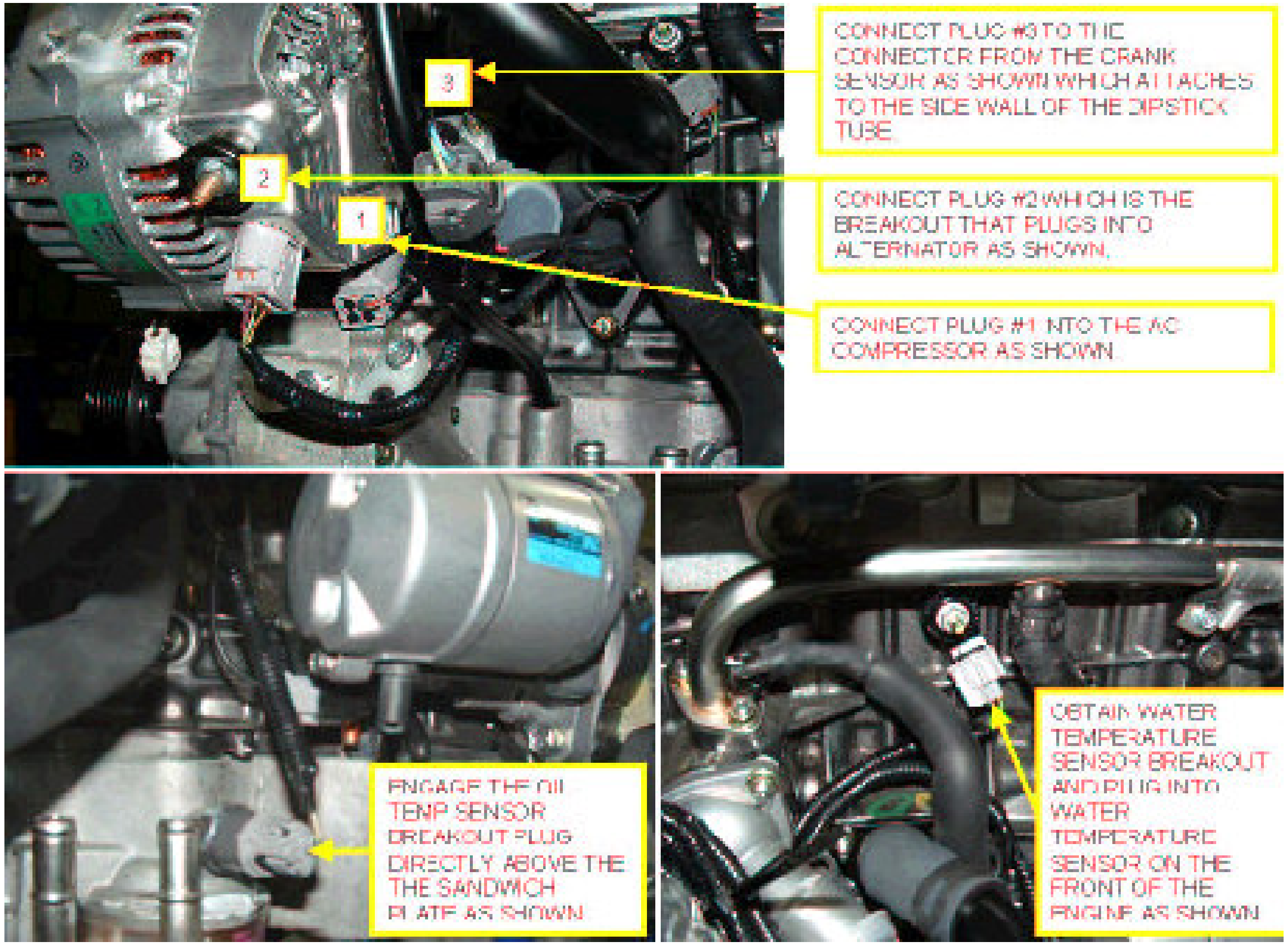
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
20	ALS3E6059F	ISOLATOR BUSH	4	-	-	
30	-	WASHER- M8 X 14 X 1. 4MM	8	-	-	
40	-	NUT- NYLOC M8’P’TYPE GR8 P/ Zn	8	-	-	
				-	-	



SEQ	ACTIVITY – FIT NEW DIP STICK AND TUBE
10	Collect component parts required for operation
20	Fit the original dipstick into the new dipstick tube and ensure that the dipstick has click home fully into the tube
30	Fit new O ring onto the end of the dipstick tube enuring that the O ring is seated correctly
40	Push fit the dipstick tube assembly into hole lcoation on the sumo of the engine enursing that the O ring stays correctly seated during fitting operation
50	Undo the fixing on the side of the supercharger
60	Place bolt through the dip stick support bracket trhen re-fit back into removed location
70	Torque tighen fixin to specified torque
80	Green paint mark the head of each fixing once correct torque has been achieved

CAREPOINT	QUALITY STANDARD
30 Ensure that O ring is fitted correctly onto dipstick tube	

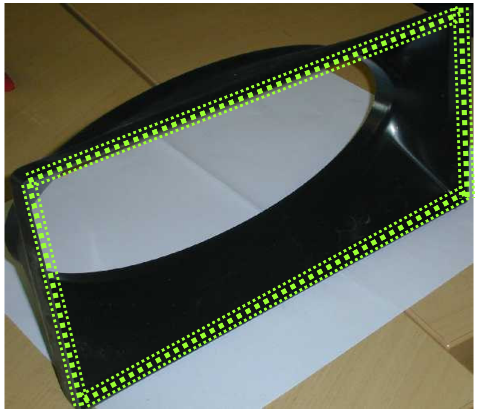
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
70	N/A	Torque / Tooling Refernce	-	-	25Nm	Torque wrench
30	A120E6281S	O Ring, Dipstick Tube	1	-	-	
20	CLS3E0051F	Dipstick Tube	1	-	-	



SEQ	ACTIVITY – ANCILLARIES
10	Obtain Harness at Water outlet on front of engine block.
20	Obtain Alternator breakout from main harness and engage into plug on front of alternator.
30	Obtain AC Compressor breakout from main harness and engage into plug on front of AC compressor.
40	Obtain plug on end of crank sensor removed from dipstick tube in op....
50	Engage connector on end of crank sensor breakout from main harness into plug from crank sensor.
60	Obtain water temperature sensor breakout from main harness and engage into plug on water temperature sensor on front of engine block.
70	Obtain final two breakouts and route across front of engine block towards gearbox.
80	Engage oil temp sensor breakout into sensor on front of engine block directly above sandwich plate.
90	Engage final breakout from engine harness into connector on RHS of starter motor.
100	Ensure all connectors are fully engaged and clicked "home"
110	Using tie wrap, Secure harness to main water outlet on front of engine block.
120	Using Side Cutters, Trim tail of tie wrap and discard.

CAREPOINT	QUALITY STANDARD
50 Crank sensor harness will be refitted to new dipstick tube	

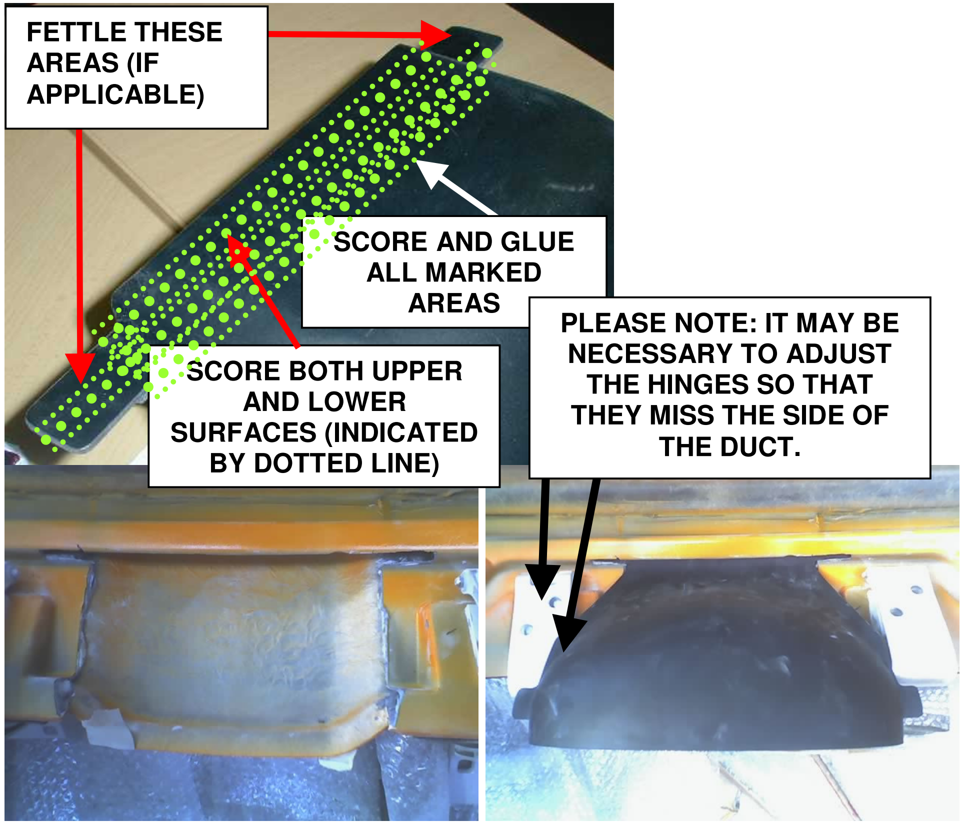
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
70	N/A	Torque / Tooling Refernce	-	-	25Nm	Torque wrench



SEQ	ACTIVITY – INTERCOOLER DUCTING
10	Taking the Bellows to Intercooler Duct, score the inner section as shown below with knife, prime the surface with BetaPrime 5404 and apply a bead of Betaseal 1701 sealer to the inner surface (it is necessary tom cut to nozzle of the betaseal 'gun' to 45 degrees to sensor proper application of bead), on the side that mates to the intercooler.
20	Press into place and secure using masking tape. Ensure no gaps are present and set aside requires 24hrs to set.
30	Fettle the rear clam for duct dry fit off the car to start with. Fit the rear clamshell onto the vehicle, taking care with the paint work.
40	Sit the Intercooler onto the bobbins, do not secure.

CAREPOINT	QUALITY STANDARD
30 Ensure that O ring is fitted correctly onto dipstick tube	

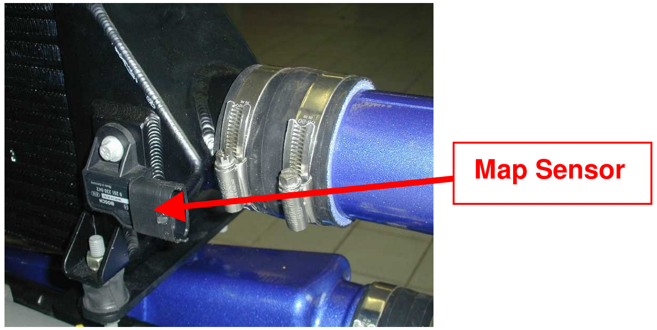
SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	ALS3E0053F	Bellows to Intercooler Duct	-	-	25Nm	Torque wrench
-	N/A	BetaPrime 5404				
-	N/A	Betaseal 1701				
10	ALS3E0052K	Hardtop to Bellows Duct				



SEQ	ACTIVITY – INTERCOOLER DUCTING
10	Taking the Hardtop to Bellows Duct, fettle the duct and/or clamshell to ensure correct fitting, and alignment between the intercooler duct and hardtop duct, score the surface with a knife and scotch brite, to prepare the surface for bonding. Dry fit the duct until the aperture on the duct is flush with the aperture on the roof. Ensure that the upper front surface of duct is flush with inner roof skin. This will allow maximum bonding area. The duct should almost 'click' into place when in correct position. This may take several attempts to correctly position
20	Using Betaprime 5404 prime the inner surface of the clamshell (fitted area only) and the duct.
30	Then using Betamate 1701 bond the duct in place, and secure with masking tape. Will require 24 hrs to go off. Set aside. Ensure aligned with the Intercooler duct and tape into position.
40	When complete, fit sealing bellows to intercooler and roof ducting

CAREPOINT	QUALITY STANDARD
30	

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
70	ALS3E0049F	Sealing Bellows, Intercooler To Duct	1	-	-	
	ALS3E0052K	Duct, Hardtop To Bellows	1	-	-	
	ALS3E0053F	Duct, Bellows To Intercooler	1	-	-	
	BLS3E0050F	RETAINING CLAMP, BELLOWS	1	-	-	





SEQ	ACTIVITY – INTERCOOLER ANCILLARIES
10	Fit the map sensor to the intercooler using M6 x 16 bolt (ensuring rubber seal on MAP sensor is intact).
20	Fit intercooler positioning on top of the 4 Isolation Bushesand secure with the remaining components of the 4 off isolation bush kits i.e. 4off plain nuts and 4off sprung washer.
30	Push fit the black Samco Hose, 2 1/2" ID, 60mm onto (1) the outlet of the outlet manifold port (2) the intercooler inlet (3) the intercooler outlet and (4) the inlet manifold inlet.
40	Fit intercooler left hand pipe and right hand pipe to either side, pushing into the previously position black Samco Hose, 2 1/2" ID, 60mm. There should be an approximate 3mm gap between the two mating surfaces. Slide 2 hose clips onto each hose before fitting the pipes.
50	Secure with two hose clamps at each end of the Samco, 2 1/2" ID hose. Ensure that hose clamp heads are positioned as detailed above.
60	Apply double sided tape around the duct edges and fit the bellows, then apply the band clamps.
70	
80	

CAREPOINT	QUALITY STANDARD

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	BLS3E6035F	T Map Sensor	1	-	-	
20	BLS3E0046F	Intercooler	1	-	-	
10	ALS3E6067F	M6 X 16 Bolt	1	-	-	
20	ALS3E6059F	Isolation Bushes	4	-	-	
30	BLS3E6043F	Samco Hose, 2 1/2" ID, 60mm	4	-	-	
40	ALS3E0044F	Intercooler Left Hand Pipe	1	-	-	
40	ALS3E0045F	Intercooler Right Hand Pipe	1	-	-	
60	BLS3E0050F	Retaining Clamp, Bellows	2	-	-	
50	ALS3E6060F	Hose Clamps	8	-	-	

SEQ	ACTIVITY – ROOF
10	Super glue 'D' section roof seal across the rear edge of the roof, the existing roof will already have a two piece seal in place, remove, ad place new seal across entire width.
20	Remove single engine cover strut from rear clamshell.
30	Bond 2 off new brackets to recess between tailgate grille apertures and 2 off new brackets to rear clamshell, allow to go off
40	Fit gas struts, check operation, close engine cover
50	Re-attach the rear clamshell to vehicle

CAREPOINT	QUALITY STANDARD

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	A117U6007F	**Seal, 'D' section, self adhesive, hard top rear**	1	-	-	
30	ALS3B0023F	Brkt., Gas Strut Mtg, Engine Cover	2	-	-	
30	ALS3B0024F	Brkt., Gas Strut Mtg, Clamshell, Rh	1	-	-	
30	ALS3B0025F	Brkt., Gas Strut Mtg, Clamshell, Lh	1	-	-	
40	CLS3B0026F	Gas Strut, Tailgate Supporting	2	-	-	

Technical Bulletin CUP240/01 – Class 3.

December 2005

Vehicles Applicable: **Lotus Sport Exige Cup vehicles converted with dealer supercharger fitting kits.**

Title: **Inter-cooler Ambient Air Intake Modification – Roof & Rear Clam**

Reason: Track/Race owners wishing to optimise inter-cooler efficiency might wish to consider the following detail changes.

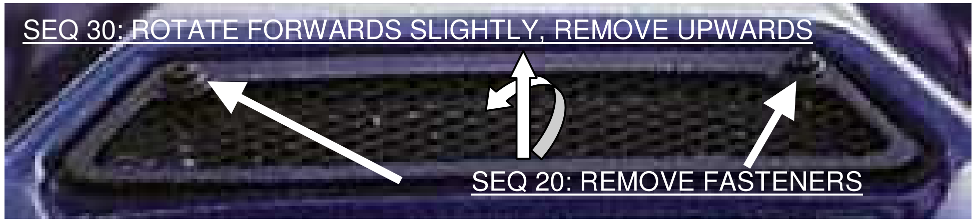
From recent tests conducted on track by Lotus Sport it was found that it was possible via some simple bodywork modifications to increase the efficiency of the inter-cooler. Typically, 'opening' out the apertures resulted in an increased frontal roof intake area of ~ 20%, which thus resulted in an inter-cooler efficiency increase of ~ 15-20%.

Action: **Modify roof scoop air intake and rear clam intake apertures.**

A copy of the modification instructions has been enclosed for each customer that owns a kit fitted by Lotus Sport.

Note:

1. **This modification is for track use only**
2. **Existing restrictions regarding warranty cover for race/competition activities will still apply. See warranty manual for clarification.**
3. **No warranty claims for labour fitting or other will be accepted.**







SEQ	ACTIVITY
10	Remove Roof From Vehicle and place on suitable worktop surface. If Roof Scoop Grille is already installed go to sequence 20 if not go to sequence 40
20	Remove the upper plastic fasteners (A100W6479F) from the grille and discard
30	Slide the grille upwards and out, noting the two location feet on the grille.
40	Using a suitable file, 'fettle' out to the intake return edges, this should involve removing about 2-3 mm from the 'lip'. *It is at the clients' discretion as too how much should be removed.

CAREPOINT		QUALITY STANDARD	
10	Do not attempt to remove the grille with the roof in situ	10	
30	Do not attempt to remove the grille by 'pulling' from the front leading edge of the grille. This will damage the body and paint work.	20	
40	Wear appropriate protective equipment, mask, gloves, and goggles when sanding the roof area.	30	
40	Care should be taken when 'fettling' not to chip, crack or damage the surrounding paint.	40	

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	-	-	-	-	-	12" X 1" FLAT FILE, 12" X 0.5"OD ROUND FILE, STANLEY KNIFE, SCISSORS, MASKING TAPE



SEQ	ACTIVITY
10	With the rear clamshell in situ, mask of the leading edge of the rear clam shell around the air intake ducting to prevent damage to paint and bodywork Note the 2mm proud 'lip' that runs along the lower leading edge.
20	'Fettle' the return edge down so that it is flush with the lower leading edge of the air intact aperture.
30	'Fettle' both left hand and right hand edges to ensure that each aligns and is flush with the ABS ducting bonding behind.
40	Seal any intake area edges to prevent air loss.

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OFFENDING COMMAND: f‘

STACK: